# User Guide

## IP Link® Pro Products

# IPCP Pro Series

IP Link Pro Control Processors

PRELIMINARY

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Extron Electronics

INTERFACING, SWITCHING AND CONTROL

68-2438-01 Rev. Ax1
04 14

# Safety Instructions

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## Korean

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# Conventions Used in this Guide

## Notifications

The following notifications are used in this guide:

**WARNING:** A warning indicates a situation that has the **potential** to result in death or severe injury.

**CAUTION:** A caution indicates a situation that **may** result in minor injury.

**ATTENTION:** Attention indicates a situation that may damage or destroy the product or associated equipment.

**NOTE:** A note draws attention to important information.

**TIP:** A tip provides a suggestion to make working with the application easier.

## Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,Op1 scene 1,1 ^B 51 ^W^C
[Ø1] R ØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]
```

Esc X1 * X17 * X20 * X23 * X21 CE ←

**NOTE:** For commands and examples of computer or device responses mentioned in this guide, the character "Ø" is used for the number zero and "O" is the capital letter "o."

Computer responses and directory paths that do not have variables are written in the font shown here:

```
Reply from 2Ø8.132.18Ø.48: bytes=32 times=2ms TTL=32
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

```
ping xxx.xxx.xxx.xxx –t
SOH R Data STX Command ETB ETX
```

Selectable items, such as menu names, menu options, buttons, tabs, and field names are written in the font shown here:

From the **File** menu, select **New**.

Click the **OK** button.

# Specifications Availability

Product specifications are available on the Extron website, **www.extron.com**.

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# Introduction

This section covers the following basic information you should know about this guide and the product before installation:

- **Before You Begin** — What this guide covers and does not cover, and what terms are used to refer to these products
- **About the IPCP Pro Series** — An overview of the products and their features
- **Application Diagrams** — Example application diagrams
- **Device Control** — General information about IR, RS-232, and Ethernet control of other products
- **About Global Configurator (with GC Professional and GC Plus Modes)**
- **PC System Requirements** — Where to find computer and network system requirements

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## Before You Begin

### What This Guide Covers

This user guide provides instructions for an experienced installer to install an Extron IPCP Pro Series IP Link Pro Control Processor. In this guide you will find detailed information and best practices recommendations about cabling the control processor, a brief overview of the configuration process, and reference information.

You will configure the control processor using Extron Global Configurator software running in Global Configurator Professional (GC Professional) or Global Configurator Plus (GC Plus) mode. This guide does not contain instructions on detailed software-related setup steps or details of configuration within the software: those are covered in the *Global Configurator Help* file and help files for related programs. The software help files describe how to use each program to download drivers, add AV devices to a configuration, configure basic functions, and set up schedules, macros, e-mail alerts, touchpanel button configurations, and the like.

### Conventions Used In This Guide

Throughout this guide the IPCP Pro Series products are also referred to as the "IPCP," "IPCP Pro," or "control processor." Global Configurator software is referred to as "GC", which can be run in Global Configurator Professional mode ("GC Professional") or Global Configurator Plus mode ("GC Plus"). The GlobalViewer Enterprise application is sometimes referred to as "GVE." Unless otherwise noted, in images of software or web pages, circled numbers correspond to the like-numbered procedural steps.

### Important Information You Need Before You Install These Control Processors

The IPCP Pro Series control processors and TouchLink Pro touchpanels **work differently** from the previous generation of IP Link products. The order and types of setup tasks are important. Pay close attention to them. Follow the setup checklist in the **Hardware Features and Installation** section starting on page 7.

# About the IPCP Pro Series

The IPCP Pro Series Control Processors integrate Ethernet connection into AV systems to allow users to remotely control, monitor, and troubleshoot AV equipment, including display devices and switchers, source devices, and various other items such as lights, a projector lift, or a screen motor. They can be used in a distributed control system environment or as stand-alone control processors. Some models also have the ability to power devices that accept 12 VDC.

**Figure 1. IPCP Pro 250 (left), IPCP Pro 350 (center), IPCP Pro 550 (right)**

An IPCP Pro Series control processor acts as the centerpiece of a control system that features Extron TouchLink Pro Touchpanels. The IPCP supports multiple TouchLink Pro touchpanels over a standard Ethernet network. The touchpanels provide a convenient, aesthetically pleasing interface for controlling the IPCP, which, in turn, controls the other system components. Another option is to use a third party device such as a touchpanel or tablet in conjunction with Extron LinkLicense.

**NOTE:** GUI Designer is used to design the user interface layout any Extron TouchLink Pro touchpanel or third party touch interface that will be used with the IPCP.

The IPCP is configured completely via Global Configurator software. Once you have set up how you want it to work (set up IP addresses and functions, assigned drivers to ports, configured relays and digital input or output), that information is saved to a project configuration file that is built and uploaded into the IPCP and to any optional TouchLink touchpanels.

The IPCP Pro Series integrates seamlessly with Extron GlobalViewer Enterprise (GVE) software and the GlobalViewer web-based AV resource management tool for remote control applications.

## Features

### General features

**Flexible options for device control** — The IPCP offers RS-232 and infrared (IR) control, TCP/Ethernet control and monitoring, relays, and either digital I/O (digital input or digital output) or flexible I/O (analog input or digital input or digital output) controls. Some models also offer independently switched 12 VDC power output or a port for volume control of an Extron audio amplifier.

**Rack mountability** — All models except the IPCP Pro 350M are housed in a standard 1U high enclosure which is easily rack mounted or can be installed in or under furniture with an optional mounting kit.

**Universal power system compatibility**

- The IPCP Pro 550 includes an internal power supply that accepts 100-240 VAC, 50-60 Hz input.
- Other models include a 12 VDC external power supply that accepts 100-240 VAC, 50-60 Hz input.

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## Network and configuration features

- **Global compatibility** — The IPCP uses industry standard Ethernet communication protocols, including DHCP, DNS, HTTP, HTTPS, ICMP, NTP, SFTP, SMTP, SNMP, SSH, TCP/IP, and UDP/IP.
- **Embedded web pages** — The IPCP embedded web pages include online diagnostics and monitoring of basic features.
- **Network switch** — The IPCP Pro 350 and IPCP Pro 350M include an unmanaged 3 port switch which supports 10Base-T up to gigabit (1000Base-T) Ethernet communication. Connect any one of these ports to the LAN for communication with the IPCP. Connect the other two ports to devices such as TouchLink Pro touchpanels and network-controlled AV devices.
- **Remote equipment management** — The IP Link Pro connection allows you to remotely manage, monitor, and control several Ethernet-enabled products such as projectors, cameras, video conferencing equipment, switchers, and other AV equipment. The IPCP provides support for the following:
  - TCP and UDP connections
  - Password-protected TCP connections
  - Up to eight Ethernet devices at a time depending on the configuration mode (GC Professional or GC Plus)
  - Connection via IP address or host name
- **Multi-level password protection** — Allows security to be set based on user roles.
- **System asset management** — The software/control processor/configured system allows you to control, monitor, and schedule various functions of devices in the system.
- **E-mail notification** — The IPCP can be set up to send e-mail notifications, such as a notice that a projector has been disconnected or the projector lamp has been used for a designated number of hours.

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## Application Diagrams

The following figures show examples of types of devices that can be connected to some of the ports on the IPCP Pro Series control processors.

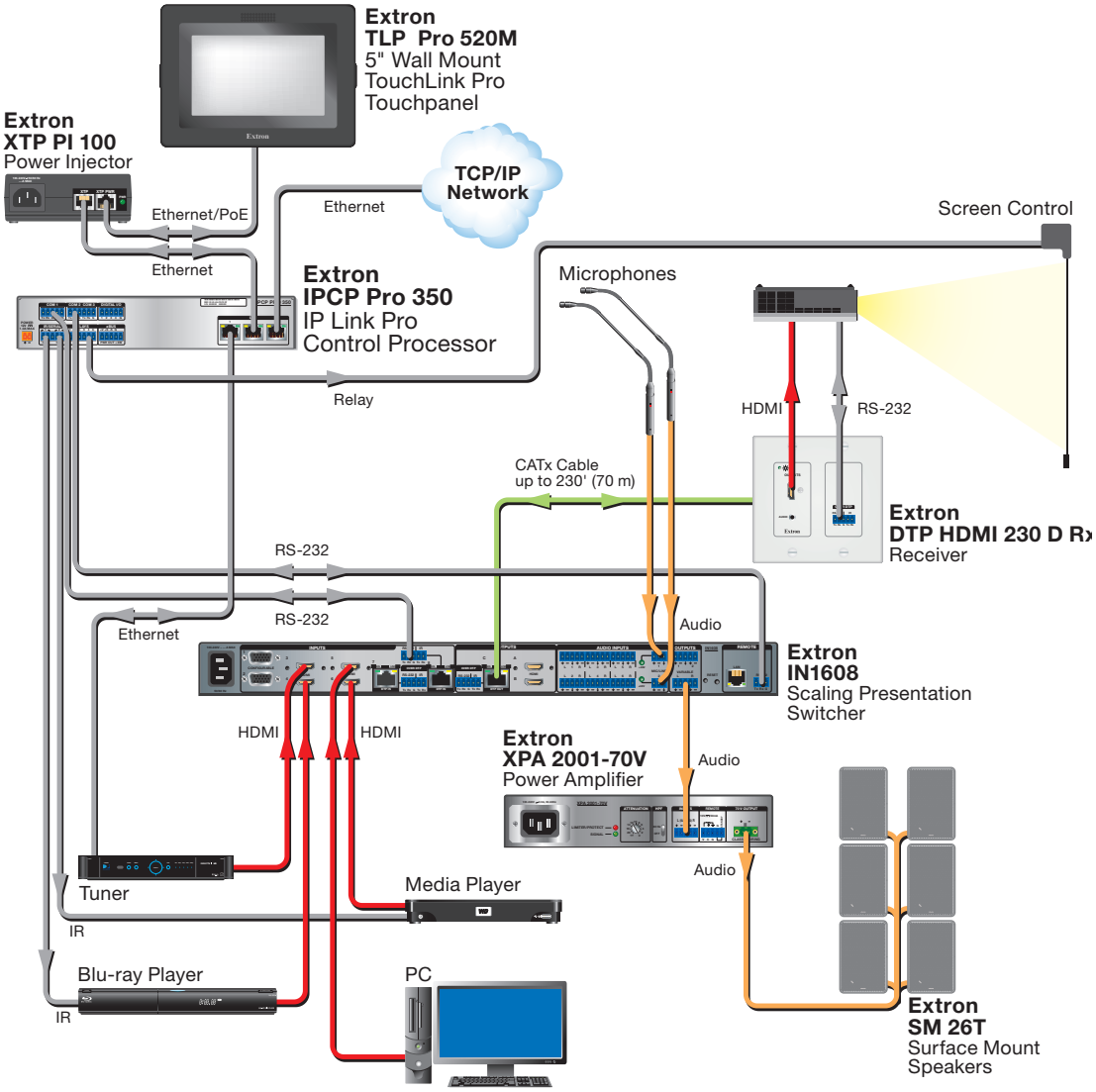


**Figure 2. An IPCP Pro 350 Application**

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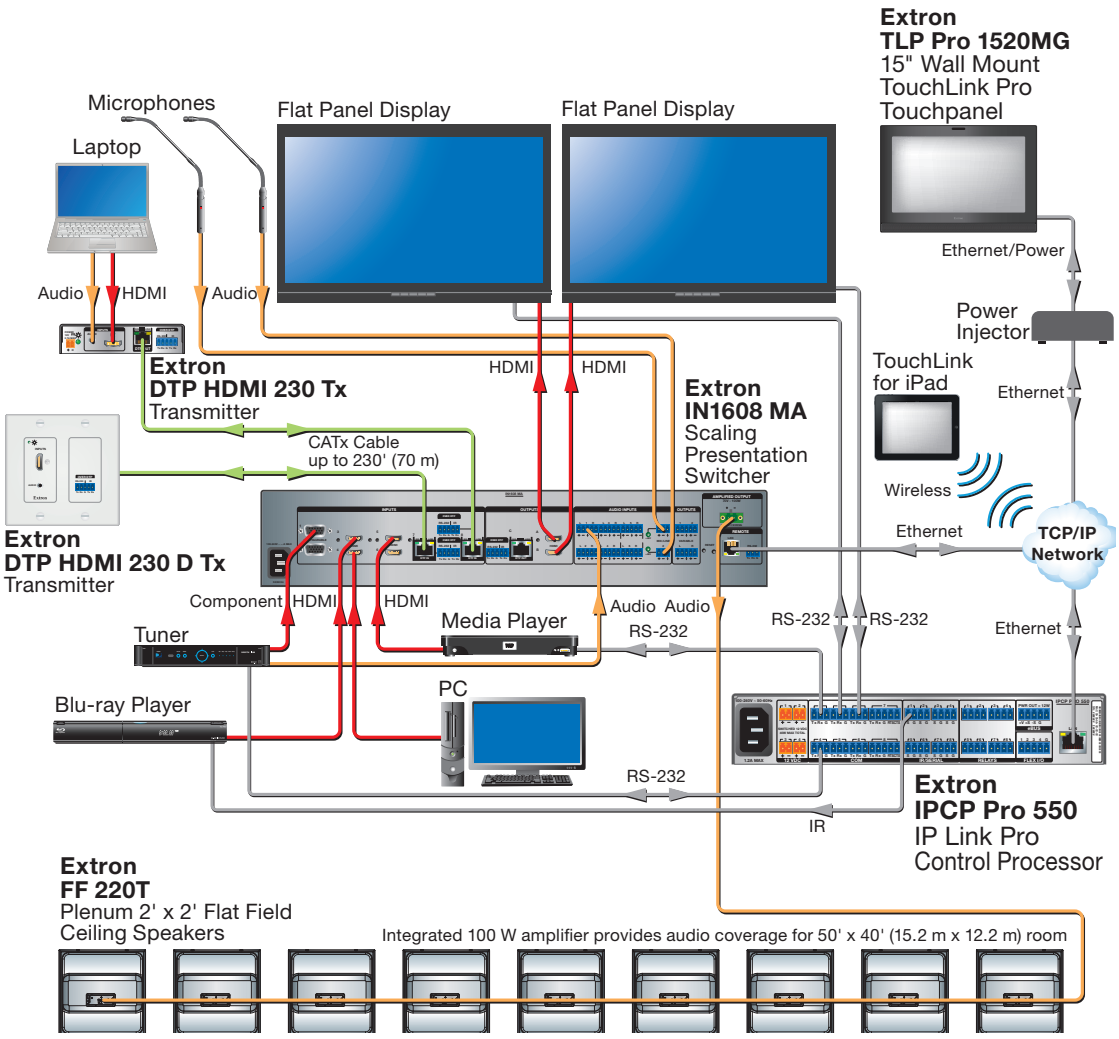


**Figure 3. An IPCP Pro 550 Application**

## Device Control

The IPCP must be configured in one of the following ways before it will send commands to a projector, display, or other device:

- An IR, RS-232, or Ethernet driver file can be downloaded from the extensive Extron driver selection from the Extron website (**www.extron.com/download/index.aspx**). The driver is saved to a folder and commands from the driver are incorporated into the configuration file for the control processor and any touchpanels that will work with it. The configuration file is built and uploaded to the IPCP via GC.
- If a driver is not already available, RS-232 or Ethernet command strings can be entered directly from a host computer using Global Configurator. These can then be incorporated into controls within the GC project.
- IR commands can be entered directly from an IR remote control through IR learning via GC to create a driver that the IPCP can use. IR learning is seldom needed, but it is convenient for installing new or updated commands into the IPCP Pro Series in the field in the rare cases when a driver is not already available from Extron.

See the *Global Configurator Help* file (which comes with the software) for details on setting up the IPCP and for downloading, programming, or learning device control commands.

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## About Global Configurator (with GC Professional and GC Plus Modes)

Global Configurator is the software tool for network setup and configuration of an IPCP Pro control processor. Global Configurator:

- Loads device drivers for monitoring the status of and controlling devices within the AV system.
- Uploads GUI Designer layouts to touchpanels and third party touch interfaces.
- Creates the configuration containing all the settings for the control processor and the products with which it interacts in the AV system.
- Generates a graphical user interface called GlobalViewer (GV) that is uploaded to the control processor (a GlobalViewer host device) along with the completed configuration and can be accessed as a web page.

Using GlobalViewer, users can monitor and control Extron and third-party equipment such as projectors, displays, computer monitors, VCRs, and DVD players.

Global Configurator Professional is the licensed mode of the software.

## PC System Requirements

To find the minimum hardware and software requirements for the PC you will use to configure the IPCP Pro Series:

- Visit the Download page (**www.extron.com/download/index.aspx**) on the Extron website and navigate to web page for the specific software package (such as Global Configurator and GUI Designer). Minimum PC hardware and software system requirements are listed in the description section. In some cases, minimum device firmware version requirements are also listed there.
- If system requirements are not listed on the software package web page, contact an Extron support representative.

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# Hardware Features and Installation

This section covers the following material:

- **Setup Checklist: How to Proceed With Installation** — A checklist of tasks to guide you through installation
- **Network Communication Setup** — A flowchart guide to network settings configuration
- **Front Panel Features** — Locations and some descriptions of items on the front panel
- **Mounting the IPCP Pro Series** — Brief guidelines for mounting
- **Rear Panel Features and Connections** — Locations, descriptions, and cabling notes for rear panel features and corresponding front panel indications
- **Resetting the Unit** — Information about the available reset modes and how to reset the IPCP

The IPCP Pro Series control processors **work differently** from the previous generation of IP Link products. Pay careful attention to the order and types of setup tasks. Follow the setup checklist in this guide or in the setup guide and keep it with you for reference throughout the installation and configuration process.

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## Setup Checklist: How to Proceed With Installation

### Get Ready

☐ Familiarize yourself with the features of the control processor (see **Front Panel Features** on page 10 and **Rear Panel Features and Connections** on page 12) and of any TouchLink Pro touchpanels that will be part of the system.

☐ Download and install the latest version of the following:

- **Global Configurator (GC) software** — for setting up and configuring the control processor. GC Professional and GC Plus modes include the **Toolbelt** feature, **IR Learner Pro** (for creating IR driver files using the remote controls of AV products if drivers are not already available from Extron), and a way to upgrade the firmware of the control processor if the need arises.
- **IP Link Pro device drivers** — for use with GC, to make control of other devices possible
- **GUI Designer software** — for designing layouts for Extron Touchlink Pro touchpanels and third party touch interfaces

All are available from **www.extron.com** (see **Locating Software, Firmware, and Driver Files on the Extron Website** on page 27).

☐ Obtain network information for the unit from the network administrator. You will need the following details for each IP Link Pro device:

- ☐ DHCP setting (on or off)
- ☐ Device (IPCP Pro, TouchLink Pro, IPL Pro) IP address
- ☐ Subnet mask
- ☐ Gateway IP address
- ☐ Username
- ☐ Passwords

☐ Write down the MAC addresses of each IP Link Pro device to be used.

☐ Obtain model names and setup information for devices the IPCP will control.

## Mount and Cable All Devices

- ☐ Mount the unit to a rack or furniture (see **Mounting the IPCP Pro Series** on page 11).
- ☐ Cable devices to the control processor (see **Rear Panel Features and Connections** starting on page 12).
- ☐ Connect power cords and power on all the devices.

## Set Up the Control Processor and Touchpanels for Network Communication

- ☐ Connect the PC that you will use for setup, the control processor, and touchpanels to the same Ethernet subnetwork. For control processor LAN connections, see **LAN or LAN A (IP) connectors and LEDs** on page 16.
- ☐ Start Global Configurator and use the Toolbelt feature of the software to set the IP address, subnet, gateway IP address, DHCP status, and related settings. See the flowchart in **Network Communication Setup** on page 9.

## Configure the Control Processor and Touchpanels

The most basic steps are outlined below in the recommended order.

**NOTE:** See the *Global Configurator Help* file and *GUI Designer Help* file as needed for step-by-step instructions and detailed information. The help file for GC includes an introduction to the software and how to start a project and configuration.

- ☐ If TouchLink Pro touchpanels will be part of the system, start and use GUI Designer to **design, save, and build the graphical user interface (GUI) layout** for the touchpanels. See the *GUI Designer Help* file for instructions.
- ☐ Using GC, **create a new GC Professional or GC Plus project and configure the control processor and other IP Link Pro devices**. The configuration tells the control processor how its ports will function; how to control other products; which touchpanels to interact with; what to monitor; when to do things; and whom to notify, how, and under what circumstances.
  - ☐ Configure ports on the control processor.
    - Select device drivers and link them to each serial, IR/serial, or Ethernet port.
    - Select settings (serial protocol, relay behavior, digital I/O or flex I/O settings) as needed.
  - ☐ Set up monitors, schedules, macros, and local variables.
  - ☐ Add touchpanels and set them up:
    - Upload the GUI configuration to the touchpanels using Global Configurator.
    - Assign any appropriate functions, monitors, or schedules to the touchpanels and their buttons.
- ☐ Save and build the project.
- ☐ Upload the system configuration to the control processor.

## Test and Troubleshoot

- ☐ Test the system. See the **Troubleshooting** section starting on page 30 for an outline of items to check during system troubleshooting.
- ☐ Make adjustments to wiring or configuration as needed.

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## Network Communication Setup

Network setup is essential prior to configuration. Use the flowchart as a guide to setting up the control processor for network use.

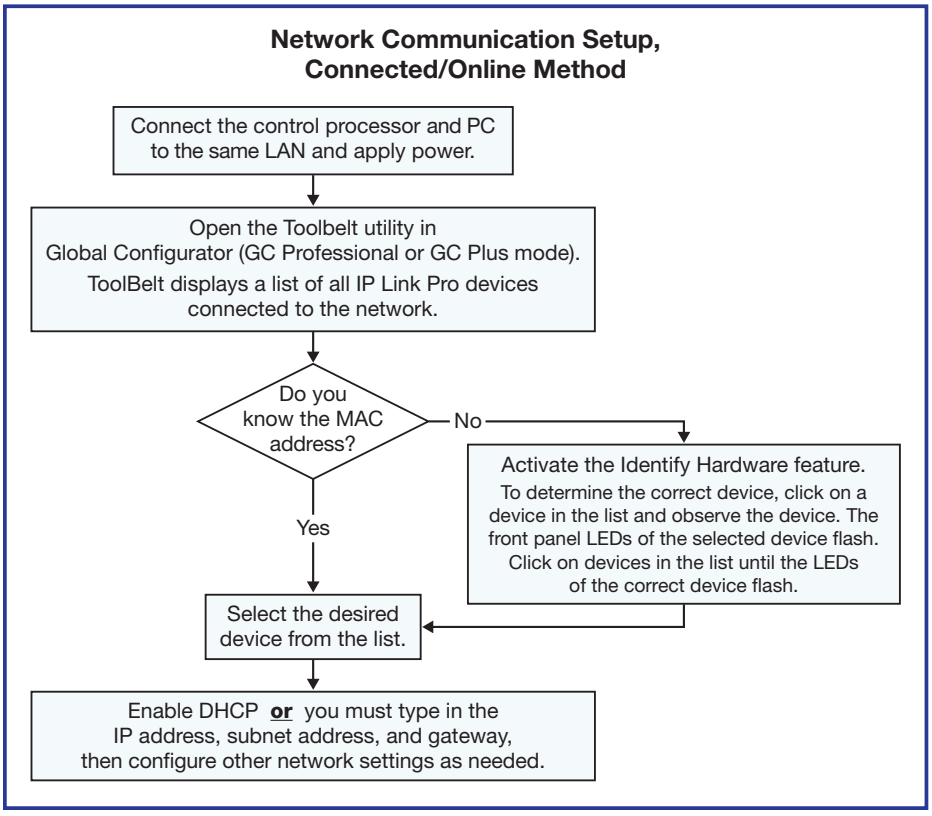
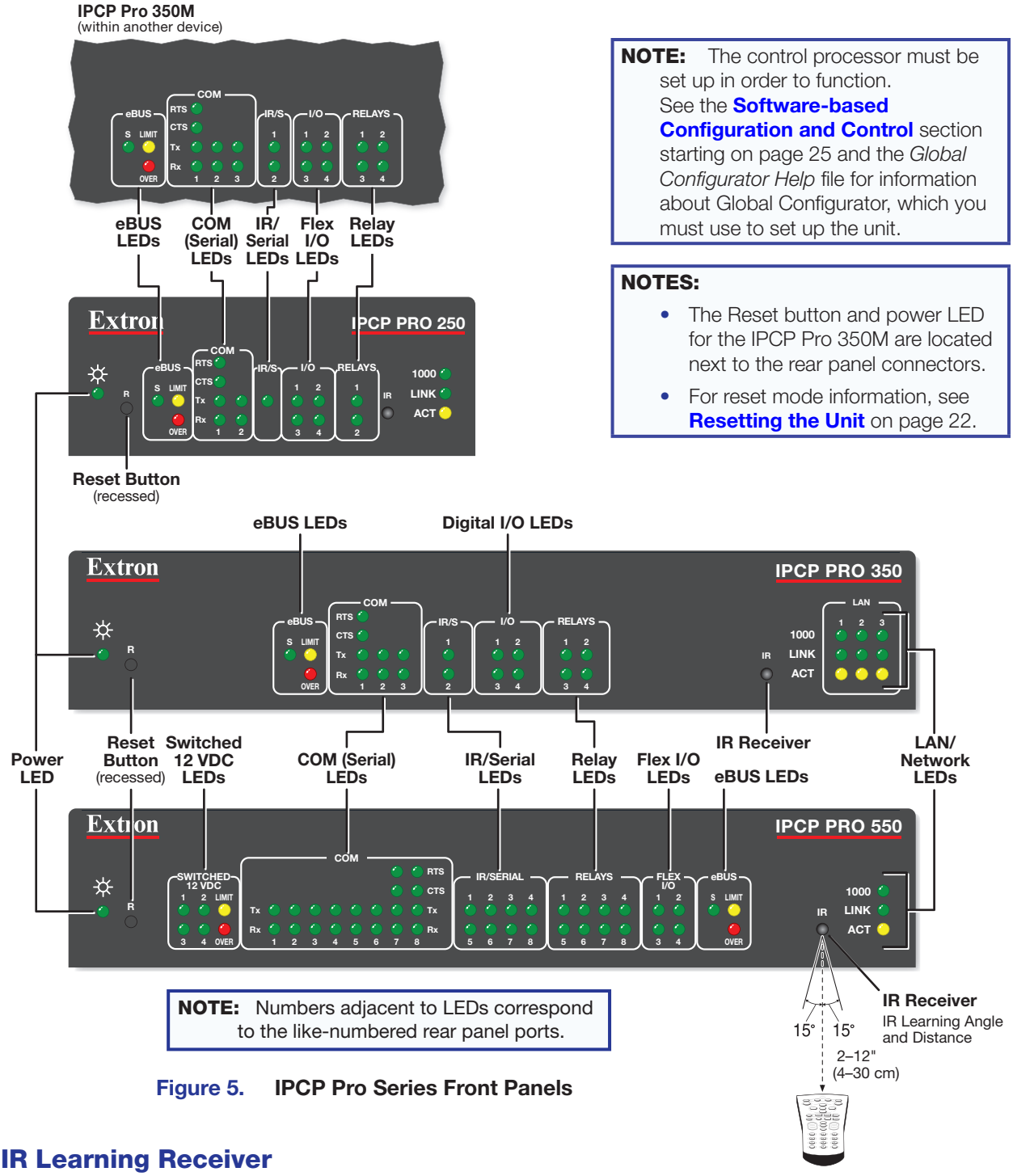

Network Communication Setup,
Connected/Online Method
Connect the control processor and PC to the same LAN and apply power.
Open the Toolbelt utility in Global Configurator (GC Professional or GC Plus mode).
ToolBelt displays a list of all IP Link Pro devices connected to the network.
Do you know the MAC address?
No
Yes
Activate the Identify Hardware feature.
To determine the correct device, click on a device in the list and observe the device. The front panel LEDs of the selected device flash. Click on devices in the list until the LEDs of the correct device flash.
Select the desired device from the list.
Enable DHCP or you must type in the IP address, subnet address, and gateway, then configure other network settings as needed.

**Figure 4. Network Setup, Online Method**

PRELIMINARY

# Front Panel Features

Front panel features are shown below. The quantity and location of ports and corresponding front panel LEDs differ among IPCP models. However, the functions of each type of port and their LEDs are identical for all models. Most of the features and LED indications are described and shown in the "Rear Panel Features and Connections" section paired with the descriptions of the corresponding rear panel ports.




**NOTE:** The control processor must be set up in order to function. See the **Software-based Configuration and Control** section starting on page 25 and the *Global Configurator Help* file for information about Global Configurator, which you must use to set up the unit.

**NOTES:**

- The Reset button and power LED for the IPCP Pro 350M are located next to the rear panel connectors.
- For reset mode information, see **Resetting the Unit** on page 22.

**NOTE:** Numbers adjacent to LEDs correspond to the like-numbered rear panel ports.

**Figure 5. IPCP Pro Series Front Panels**

## IR Learning Receiver

In most cases, Extron has already produced a driver file for controlling the projector, display, or source device you plan to use. If a device driver file is not available, you can create your own using Extron IR Learner software, the remote control of the projector or display, and the IR learning receiver sensor on the IPCP, shown the figure above.

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This receiver accepts infrared signals of from 30 kHz to 300 KHz. The IR remote control must be pointed directly at the receiver for best results. The front panel diagram (figure **5**) indicates the best distances and angles at which to hold the remote control.

**NOTE:** The IPCP 350M does not have an IR learning sensor.

### Reset Features

**Reset button and LED** — Pressing this recessed button causes various IP functions and Ethernet connection settings to be reset to the factory defaults. The green power LED flashes depending on the selected reset mode (see **Resetting the Unit** and the reset modes table on page 22 for details).

## Mounting the IPCP Pro Series

### Mounting Options

Optional 1U high rack shelves and a variety of rack mounting bracket kits and furniture mounting kits are available for use with the IPCP. Visit the product-specific page on the Extron website for a list of compatible accessories for mounting your control processor or call a support representative to find out which kit to order for your installation. Read the instructions that come with the rack shelf or mounting kit for installation procedures and see the UL rack mounting guidelines (below) for safe installation.

### UL Rack Mounting Guidelines

The following **Underwriters Laboratories (UL)** guidelines pertain to the safe installation of IPCP Pro Series control processors in a rack.

1. **Elevated operating ambient temperature** — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the IPCP in an environment compatible with the maximum ambient temperature (Tma = +122 °F, +50 °C) specified by Extron.
2. **Reduced air flow** — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (such as use of power strips).

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# Rear Panel Features and Connections

**ATTENTION:** Installation and service must be performed by experienced personnel.

**ATTENTION:** L'installation et l'entretien doivent être effectués par du personnel expérimenté.

The quantity of ports and corresponding front panel LEDs differs among IPCP models, but the functions of each type of port and their LEDs are identical for any model that includes that type of port.

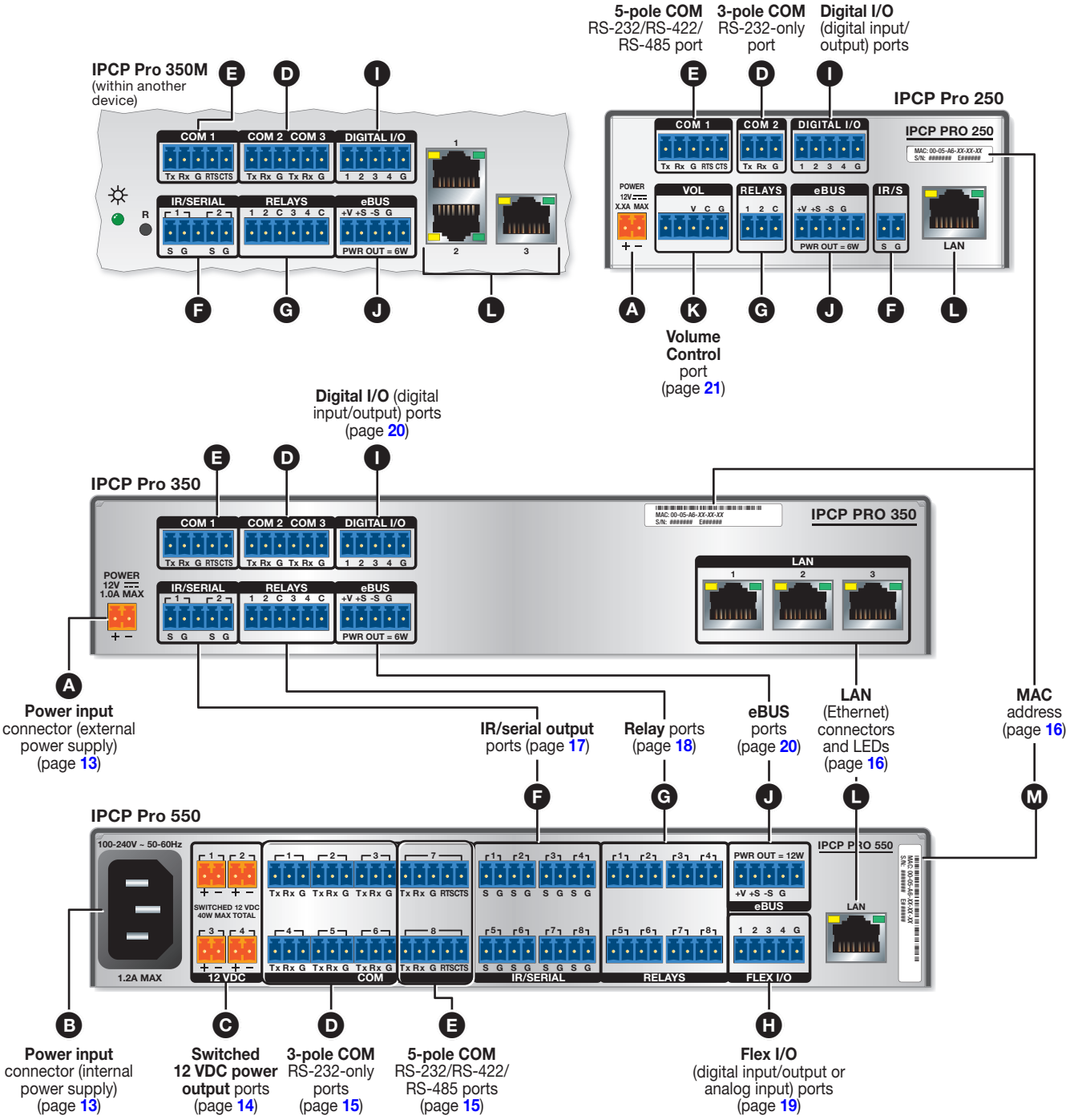
5-pole COM RS-232/RS-422/ RS-485 port
3-pole COM RS-232-only port
Digital I/O (digital input/ output) ports
IPCP Pro 350M (within another device)
IPCP Pro 250
IPCP PRO 250
Volume Control port (page 21)
Digital I/O (digital input/output) ports (page 20)
IPCP Pro 350
IPCP PRO 350
Power input connector (external power supply) (page 13)
IR/serial output ports (page 17)
Relay ports (page 18)
eBUS ports (page 20)
LAN (Ethernet) connectors and LEDs (page 16)
MAC address (page 16)
IPCP Pro 550
IPCP PRO 550
Power input connector (internal power supply) (page 13)
Switched 12 VDC power output ports (page 14)
3-pole COM RS-232-only ports (page 15)
5-pole COM RS-232/RS-422/ RS-485 ports (page 15)
Flex I/O (digital input/output or analog input) ports (page 19)

**Figure 6. IPCP Pro Series Rear Panels**

PRELIMINARY

## Power Connections

**A** **Power input connector (external power supply)** — Connect the IPCP to the included 12 VDC power supply here, then connect the external power supply to a 100 to 240 VAC power source.

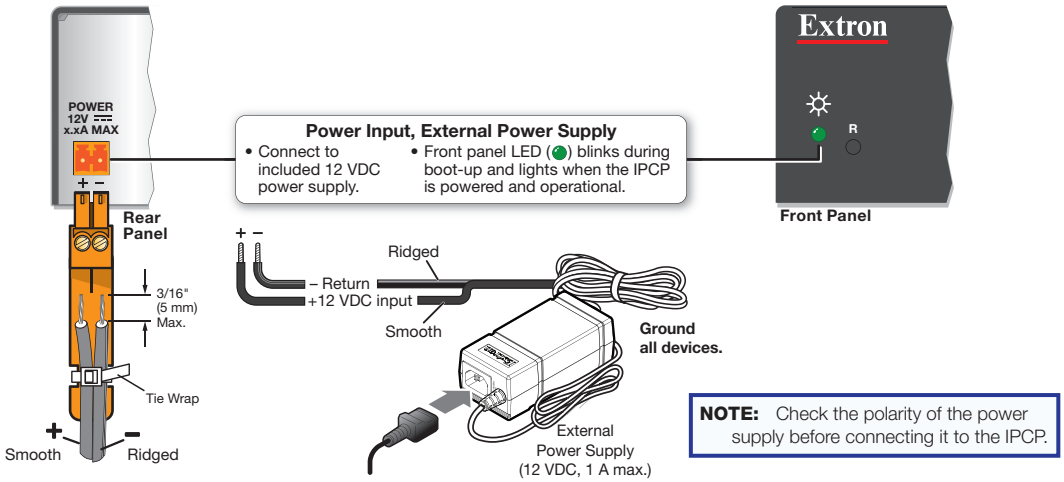


**Figure 7.** **Connecting an External Power Supply**

**ATTENTION:**

- Always use a power supply supplied or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the unit.
- Utilisez toujours une source d'alimentation fournie par Extron. L'utilisation d'une source d'alimentation non autorisée annule toute conformité réglementaire et peut endommager la source d'alimentation ainsi que l'unité.

- Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities.
- Sauf mention contraire, les adaptateurs AC/DC ne sont pas appropriés pour une utilisation dans les espaces d'aération ou dans les cavités murales.

- The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 725 and the Canadian Electrical Code part 1, section 16. The power supply shall not be permanently fixed to building structure or similar structure.
- Cette installation doit toujours être en accord avec les mesures qui s'applique au National Electrical Code ANSI/NFPA 70, article 725, et au Canadian Electrical Code, partie 1, section 16. La source d'alimentation ne devra pas être fixée de façon permanente à une structure de bâtiment ou à une structure similaire.

**B** **Power input connector (internal power supply)** — Connect the IPCP to a 100 to 240 VAC power source here.

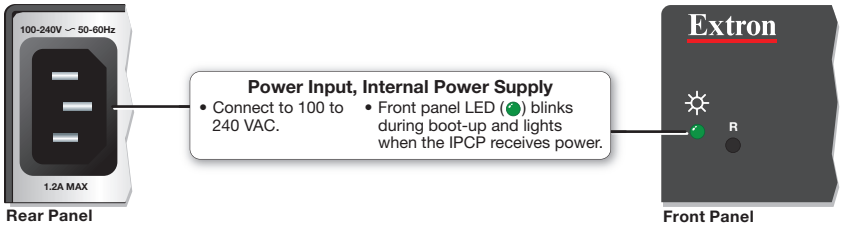
100-240V ~ 50-60Hz
1.2A MAX
Rear Panel
Power Input, Internal Power Supply
• Connect to 100 to 240 VAC.
• Front panel LED (●) blinks during boot-up and lights when the IPCP receives power.
Extron
R
Front Panel

**Figure 8.** **Connecting an Internal Power Supply**

PRELIMINARY

**C** **Switched 12 VDC power output ports** — These ports provide 12 VDC output. For the IPCP Pro 550, the four ports provide up to a combined maximum of 40 watts. Once configured, each port can be separately turned on or off. These ports are monitored continuously for total power usage (draw).

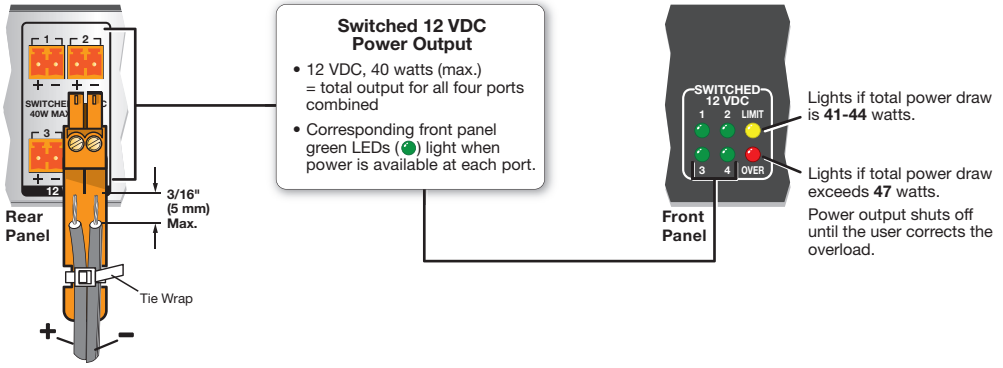
Switched 12 VDC
Power Output
• 12 VDC, 40 watts (max.) = total output for all four ports combined
• Corresponding front panel green LEDs ( ) light when power is available at each port.
Rear Panel
3/16" (5 mm) Max.
Tie Wrap
SWITCHED 12 VDC
1 2 LIMIT
3 4 OVER
Front Panel
Lights if total power draw is 41-44 watts.
Lights if total power draw exceeds 47 watts.
Power output shuts off until the user corrects the overload.

**Figure 9. Switched Power Output Ports and LEDs**

- When the total power usage exceeds a threshold of 41 watts but is still below 45 watts, the IPCP enters the **limit mode**, during which the yellow front panel Limit LED lights. If you have configured the unit to do so, the IPCP can issue a power overcurrent notice.
- If power usage exceeds a second, higher threshold (47 watts), the IPCP enters **overcurrent mode**. It turns these ports off, and the red front panel Over LED lights.

  If the ports are disabled, the user must disconnect or fix the attached devices to correct the problem. If the power draw is still excessive, the ports remain off.

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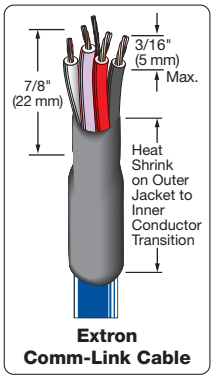
**D** **3-pole COM ports, RS-232 only** and

**E** **5-pole COM ports, RS-232/RS-422/RS-485** —
Use COM ports for serial control of a display or other device and to receive status messages from the connected devices. These ports can send commands from a driver file. RS-232 is the default serial mode for the 5-pole ports and the only mode for the 3-pole ports.

**IPCP Pro Series serial protocol:**

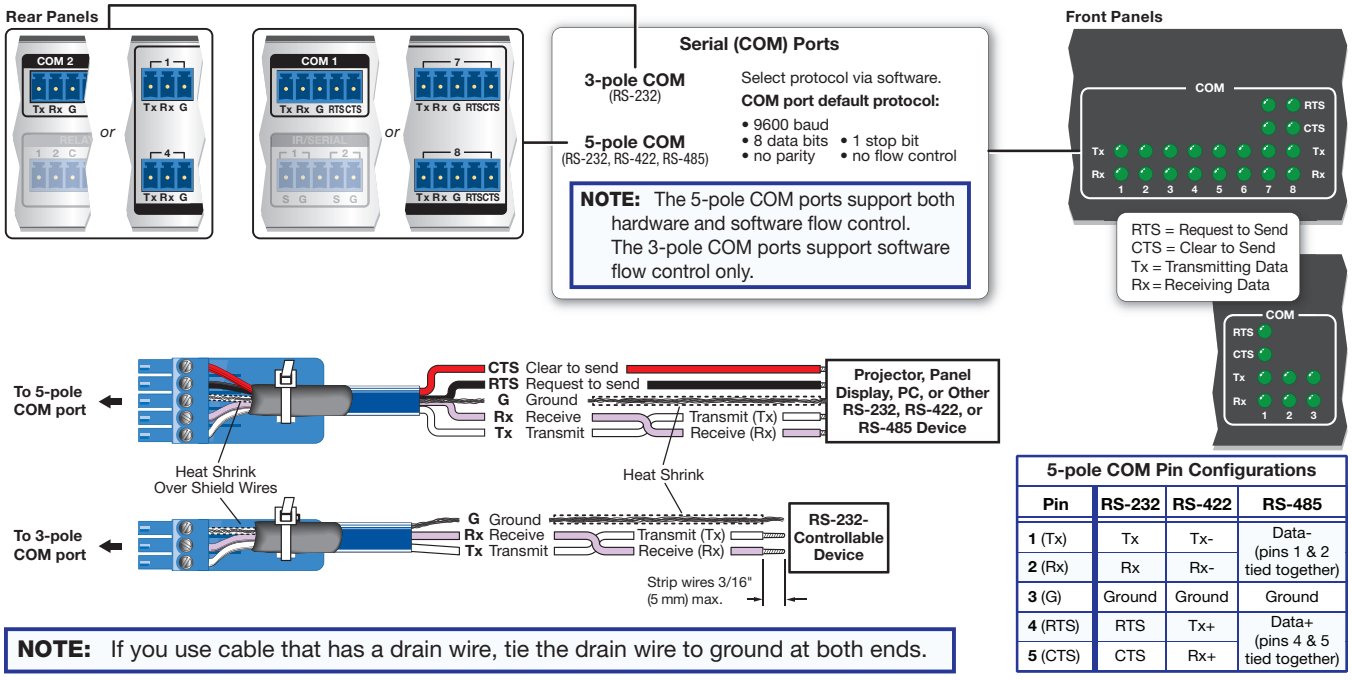
- 300 to 115200 baud (9600 baud = default)
- 8 (default) or 7 data bits
- 1 (default) or 2 stop bits
- No parity (default), even, odd, mark, or space parity
- Flow control support (default = none):
  - 3-pole ports: software-only (XON, XOFF)
  - 5-pole ports: hardware and software



**Extron Comm-Link Cable**

**TIP:** Comm-Link (CTL and CTLP) cable, shown at left, is recommended for these connections. For best results and to avoid short circuits, use shielded wires or wires insulated using heat shrink (instead of bare wires) for the common/drain wires.

Use the following diagram as a wiring guide to cable the IPCP to other devices.




**NOTE:** If you use cable that has a drain wire, tie the drain wire to ground at both ends.

**5-pole COM Pin Configurations**

| Pin | RS-232 | RS-422 | RS-485 |
|---|---|---|---|
| **1** (Tx) | Tx | Tx- | Data- (pins 1 & 2 tied together) |
| **2** (Rx) | Rx | Rx- | |
| **3** (G) | Ground | Ground | Ground |
| **4** (RTS) | RTS | Tx+ | Data+ (pins 4 & 5 tied together) |
| **5** (CTS) | CTS | Rx+ | |

**Figure 10. Wiring COM ports for Serial Control**

For bidirectional serial communication, the transmit, ground, and receive pins must be wired at both the IPCP Pro Series and the other device. Each projector or other device may require different wiring. For details, see the manual for that equipment or read the Extron device driver communication sheet, which is included with the drivers.

**NOTE:** Maximum distances between the IPCP and the device being controlled may vary up to 200 feet (61 m). Factors such as cable gauge, baud rates, environment, and output levels (from the IPCP and the device being controlled) all affect transmission distance. Distances of about 50 feet (15 m) are typically not a problem. In some cases the IPCP may be capable of transmitting and controlling a given device via RS-232 up to 250 feet (76 m) away, but the RS-232 response levels of that device may be too low for the IPCP to detect.

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**L** **LAN or LAN A (IP) connectors and LEDs** — To connect the IPCP to an Ethernet network (so you can configure and control the IPCP and the devices connected to it), plug a cable into one of these LAN RJ-45 sockets and connect the other end of the cable to a network switch, hub, router, or PC connected to a LAN or the Internet. If the IPCP has more than one LAN or LAN A port, the rest of the LAN or LAN A ports function as simple network switches (a multiport, unmanaged switch), so that you can connect additional devices to the same network.

**Cabling:**

- For 10Base-T (10 Mbps) networks, use a CAT 3 or better cable.
- For 100Base-T (max. 155 Mbps) or 1000Base-T networks, use a CAT 5 cable.

You must configure these ports before using them. Configure the settings via Global Configurator. See **Software-based Configuration and Control** starting on page 25 of this guide for basic information on configuration.

**Activity LED** (connector and front panel) — This yellow LED blinks to indicate network activity.

**Link LED** (connector and front panel) — This green LED lights to indicate a good network connection.

**1000 LED** (front panel) — This green LED lights when the unit is connected to a gigabit network connection.

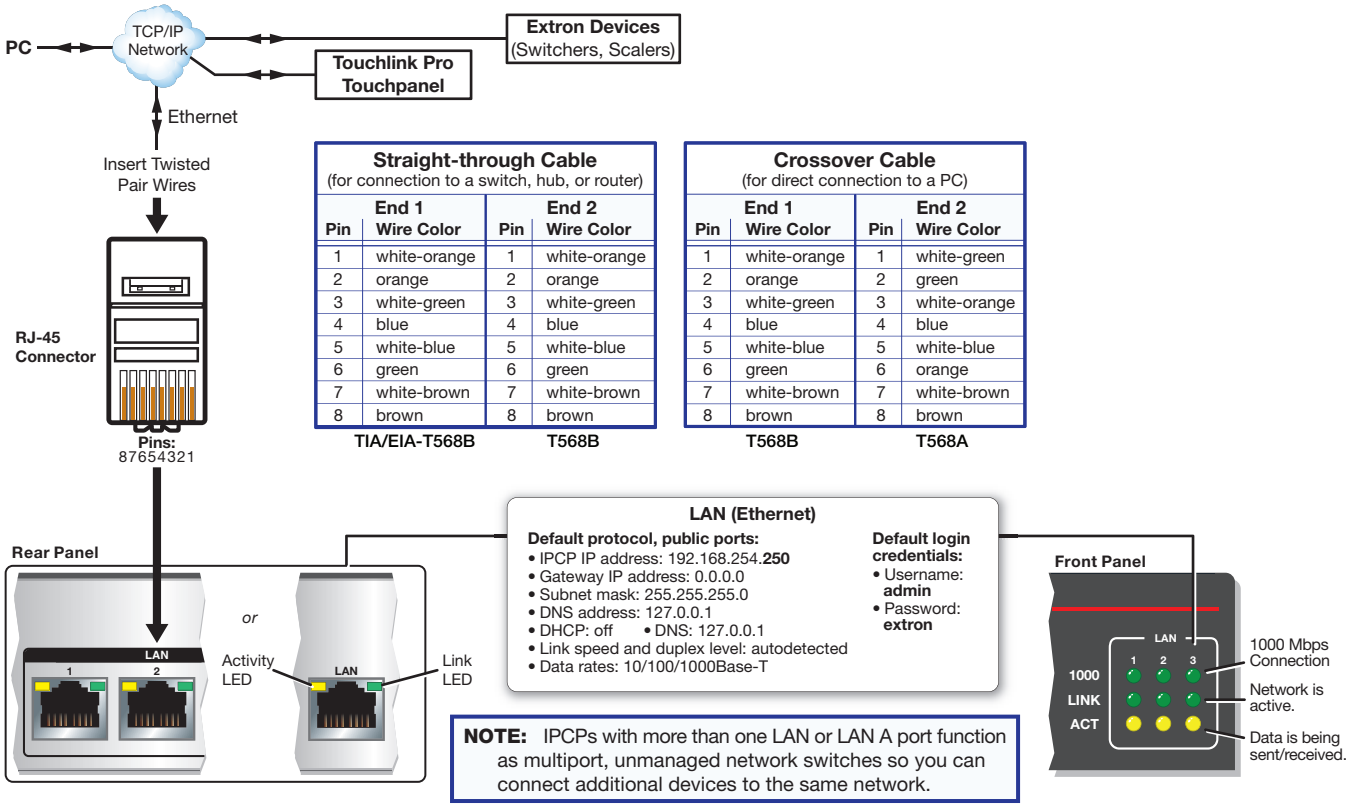
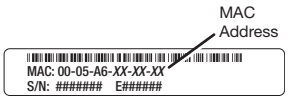

PC
TCP/IP Network
Extron Devices (Switchers, Scalers)
Touchlink Pro Touchpanel
Ethernet
Insert Twisted Pair Wires
RJ-45 Connector
Pins: 87654321
Straight-through Cable (for connection to a switch, hub, or router)
End 1 Pin | End 1 Wire Color | End 2 Pin | End 2 Wire Color
1 white-orange 1 white-orange
2 orange 2 orange
3 white-green 3 white-green
4 blue 4 blue
5 white-blue 5 white-blue
6 green 6 green
7 white-brown 7 white-brown
8 brown 8 brown
TIA/EIA-T568B T568B
Crossover Cable (for direct connection to a PC)
End 1 Pin | End 1 Wire Color | End 2 Pin | End 2 Wire Color
1 white-orange 1 white-green
2 orange 2 green
3 white-green 3 white-orange
4 blue 4 blue
5 white-blue 5 white-blue
6 green 6 orange
7 white-brown 7 white-brown
8 brown 8 brown
T568B T568A
Rear Panel
LAN
1
2
or
Activity LED
LAN
Link LED
LAN (Ethernet)
Default protocol, public ports:
• IPCP IP address: 192.168.254.250
• Gateway IP address: 0.0.0.0
• Subnet mask: 255.255.255.0
• DNS address: 127.0.0.1
• DHCP: off • DNS: 127.0.0.1
• Link speed and duplex level: autodetected
• Data rates: 10/100/1000Base-T
Default login credentials:
• Username: admin
• Password: extron
NOTE: IPCPs with more than one LAN or LAN A port function as multiport, unmanaged network switches so you can connect additional devices to the same network.
Front Panel
LAN
1 2 3
1000
LINK
ACT
1000 Mbps Connection
Network is active.
Data is being sent/received.

**Figure 11. LAN Connector and LEDs**

- Use a **straight-through cable** for connection to a switch, hub, or router.
- Use a **crossover cable** for connection directly to a PC. Wire the connector as shown in the tables above.

**NOTE:** For public LAN ports, DHCP is off by default.

**M** **MAC address** — This is the unique user hardware ID number (MAC address) of the unit (for example, 00-05-A6-05-1C-A0). You may need this address during configuration.




PRELIMINARY

## Unidirectional Control and Communication Connections

**F** **IR/Serial output ports** — An IPCP Pro Series control processor can use infrared signals or unidirectional RS-232 serial signals to control various devices (up to 4 per port for IR) via these ports. Set output signal type (IR or serial) during configuration. The figure below shows wiring examples.

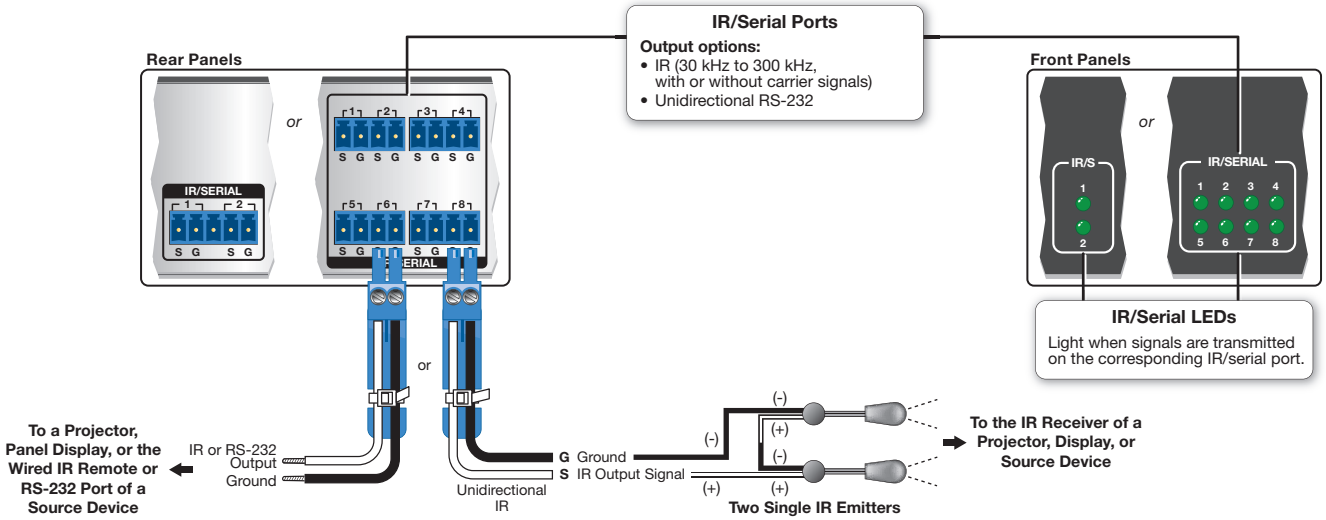

IR/Serial Ports
Output options:
• IR (30 kHz to 300 kHz, with or without carrier signals)
• Unidirectional RS-232
Rear Panels
Front Panels
or
IR/SERIAL
IR/S
IR/SERIAL LEDs
Light when signals are transmitted on the corresponding IR/serial port.
To a Projector, Panel Display, or the Wired IR Remote or RS-232 Port of a Source Device
IR or RS-232 Output
Ground
G Ground
S IR Output Signal
Unidirectional IR
Two Single IR Emitters
To the IR Receiver of a Projector, Display, or Source Device

**Figure 12. Wiring the IR/Serial Ports**

**Serial control:** Connect one of these ports to the serial control receive (Rx) and ground pins of the device to be controlled. These ports have the same **serial protocol** options (see page 15) as the COM ports.

**IR control:** Connect one of these ports directly to the wired IR port of another device. Or insert the wires from up to four IR Emitters into an IR port and place the heads of the emitters over or next to the IR signal pickup windows of the devices. For wiring, see the following figures or the *IR Emitter Installation Guide*.

**NOTE:** Each emitter must be within 100 feet of the IPCP for best IR control results.

### Installing One Single Emitter

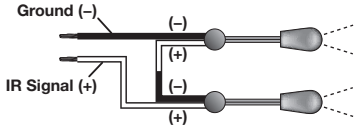
One Single IR Emitter

### Installing One Dual Emitter

Dual IR Emitter

### Installing Two Single Emitters

When installing only single emitters, tie them **in series** as shown below.




Two Single IR Emitters

PRELIMINARY

**G** **Relay ports** — Relay ports provide control for power, screen/projector lifts, window coverings, and similar items, when trigger events occur.

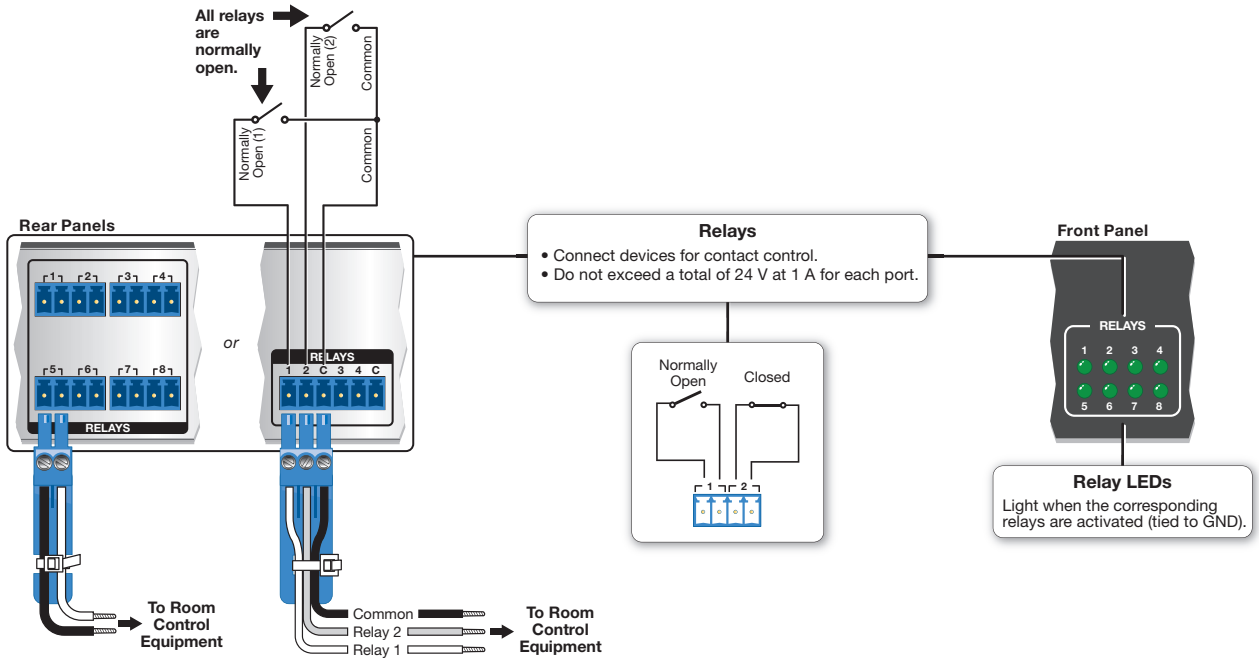



**Figure 13. Cabling Relay Ports**

These relay contacts may be used to control any equipment as long as the contact specifications of a total of 24 volts at 1 ampere are not exceeded for each port. These relays are normally open by default.

When activated, the open contacts close. They can be set up to operate in one of two ways:

- **Latching** (brief contact) (press to turn on, press to turn off), or
- **Pulsed** (timed cycle) (press to turn on, timeout to turn off, with automatic repeat).

In pulse mode the default timeout period (hold time) is ½ second (500 ms). Use Global Configurator to change the length of the timeout period.

**NOTE:** The pulse function is absolute: it always sets the relay state to closed, times out (briefly), then opens the contact. It overrides the previously selected setting (on state, off state, or toggle).

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## Additional Control Ports

Ⓗ **Flex I/O ports** —To allow the IPCP Pro Series control processor to monitor devices to trigger events, connect switches, sensors, LEDs, relays, or similar items to these ports, which can be configured as analog inputs, or as digital inputs or outputs with or without +5 VDC pull-up. These ports can trigger events or functions (such as triggering relays, issuing commands, or sending an e-mail) that have been configured using GC.

By default these ports are set to digital input mode with pullup disabled.

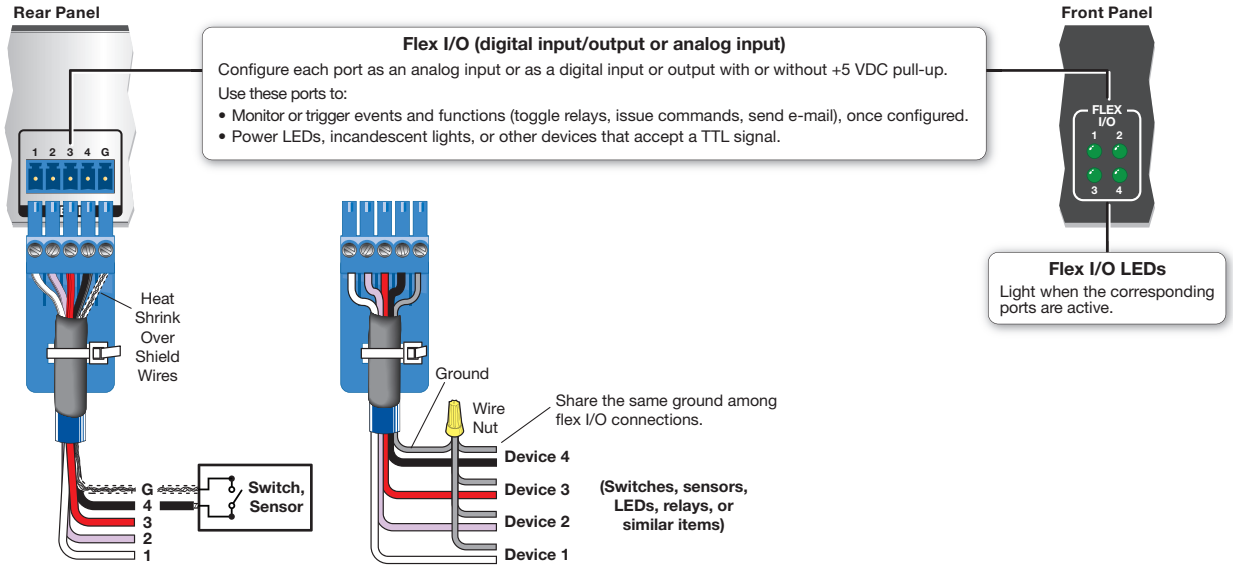
Rear Panel
Front Panel
Flex I/O (digital input/output or analog input)
Configure each port as an analog input or as a digital input or output with or without +5 VDC pull-up.
Use these ports to:
• Monitor or trigger events and functions (toggle relays, issue commands, send e-mail), once configured.
• Power LEDs, incandescent lights, or other devices that accept a TTL signal.
1 2 3 4 G
FLEX I/O
1 2
3 4
Flex I/O LEDs
Light when the corresponding ports are active.
Heat Shrink Over Shield Wires
Ground
Wire Nut
Share the same ground among flex I/O connections.
Device 4
Device 3
Device 2
Device 1
(Switches, sensors, LEDs, relays, or similar items)
G
4
3
2
1
Switch, Sensor

**Figure 14. Flex I/O Port Wiring Examples**

**Analog input** — When a flex I/O port is configured as an analog input, the port can measure 0 to 25.3 VDC with 12-bit accuracy. A DC level is indicated by a count from 0-4096 (≈ 6 mV per count).

**Digital input** — To allow the IPCP to monitor external devices that do not use RS-232 communication, connect a switch, motion sensor, moisture sensor, tally feedback output, button pad, or a similar item to a flex I/O port and configure it for digital input. When configured as a digital input, the port is set to measure two states: high and low. The port accepts 0 to 25.3 VDC input.

For flex I/O ports, threshold voltages are adjustable. Default thresholds are:

- **0.8** VDC — port on, logic low
- **2.4** VDC — port off, logic high

There is also an internal, +5 VDC, selectable, pull-up resistor for this circuit.

**Digital output** — To power LEDs, incandescent lights, or other devices that accept a TTL signal, or to provide contact closure control for projector lifts, motorized screens, room or light switches via an Extron IPA T RLY4 or similar device, you can use one or more of these ports as a digital output. When a port is configured for digital output, it offers two output states: on and off.

- When the port is set to an “on” state, (the circuit is closed), the I/O pin is connected to ground. Output voltage is less than 0.5 volts.
- When the port is set to the “off” state (the circuit is open), the output pin is not connected. If the application calls for TTL compatibility, the digital output circuit can be set up to provide a 2k ohm pull-up resistor to +5 VDC.
  - If the pull-up resistor is **disabled**, voltage output is determined by an external source device.
  - If the pull-up resistor is **enabled**, voltage output is 4.3 VDC.

Each I/O port is capable of accepting 250 mA, maximum.

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**I** **Digital I/O (digital input/output) ports** — These ports work the same way the flex I/O ports work, but they do not offer analog input, and thresholds are not adjustable. Connect switches, sensors, LEDs, relays, or similar items to these ports, which can be configured as digital inputs or outputs, with or without +5 VDC pull-up. These ports can trigger events or functions (such as triggering relays, issuing commands, or sending an e-mail) that have been configured using Global Configurator.

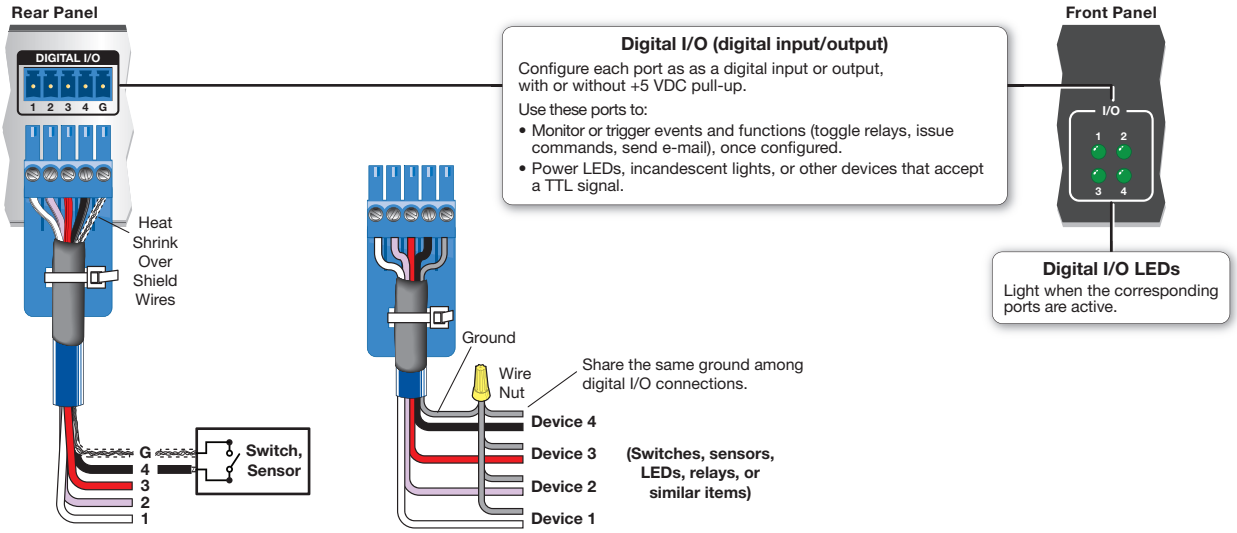
Rear Panel
DIGITAL I/O
1 2 3 4 G
Heat Shrink Over Shield Wires
G
4
3
2
1
Switch, Sensor
Digital I/O (digital input/output)
Configure each port as as a digital input or output, with or without +5 VDC pull-up.
Use these ports to:
• Monitor or trigger events and functions (toggle relays, issue commands, send e-mail), once configured.
• Power LEDs, incandescent lights, or other devices that accept a TTL signal.
Front Panel
I/O
1 2 3 4
Digital I/O LEDs
Light when the corresponding ports are active.
Ground
Wire Nut
Share the same ground among digital I/O connections.
Device 4
Device 3
Device 2
Device 1
(Switches, sensors, LEDs, relays, or similar items)

**Figure 15. Digital I/O Port Wiring Examples**

**Digital input** — To allow the IPCP to monitor external devices that do not use RS-232 communication, connect a switch, motion sensor, moisture sensor, tally feedback output, button pad, or a similar item to a digital I/O port and configure it for digital input. When configured as a digital input, the port is set to measure two states: high and low. The port accepts 0 to 25.3 VDC input.

For digital I/O ports, threshold voltages are **not** adjustable, unlike flex I/O ports. Thresholds are:

- **2.0** VDC — port on, logic low
- **2.8** VDC — port off, logic high

There is also an internal, +5 VDC, selectable, pull-up resistor for this circuit.

**Digital output** — To power LEDs, incandescent lights, or other devices that accept a TTL signal, or to provide contact closure control for projector lifts, motorized screens, room or light switches via an Extron IPA T RLY4 or similar device, you can use one or more of these ports as a digital output. When a port is configured for digital output, it offers two output states: on and off.

- When the port is set to an "on" state, (the circuit is closed), the I/O pin is connected to ground. Output voltage is less than 0.5 volts.
- When the port is set to the "off" state (the circuit is open), the output pin is not connected. If the application calls for TTL compatibility, the digital output circuit can be set up to provide a 2k ohm pull-up resistor to +5 VDC.
  - If the pull-up resistor is **disabled**, voltage output is determined by an external source device.
  - If the pull-up resistor is **enabled**, voltage output is 4.3 VDC.

Each I/O port is capable of accepting 250 mA, maximum.

**J** **eBUS port** —This port is reserved for future use.

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**K** **Volume control port** — To provide volume control for Extron half rack audio amplifiers, connect this port to the volume remote control port on the amplifier as shown below. Configure the maximum and minimum voltage limits. Set Soft Start mode off or on (default) . Soft Start mode allows volume to gradually increase from mute to the previous level after muting or power-on to prevent loud audio bursts

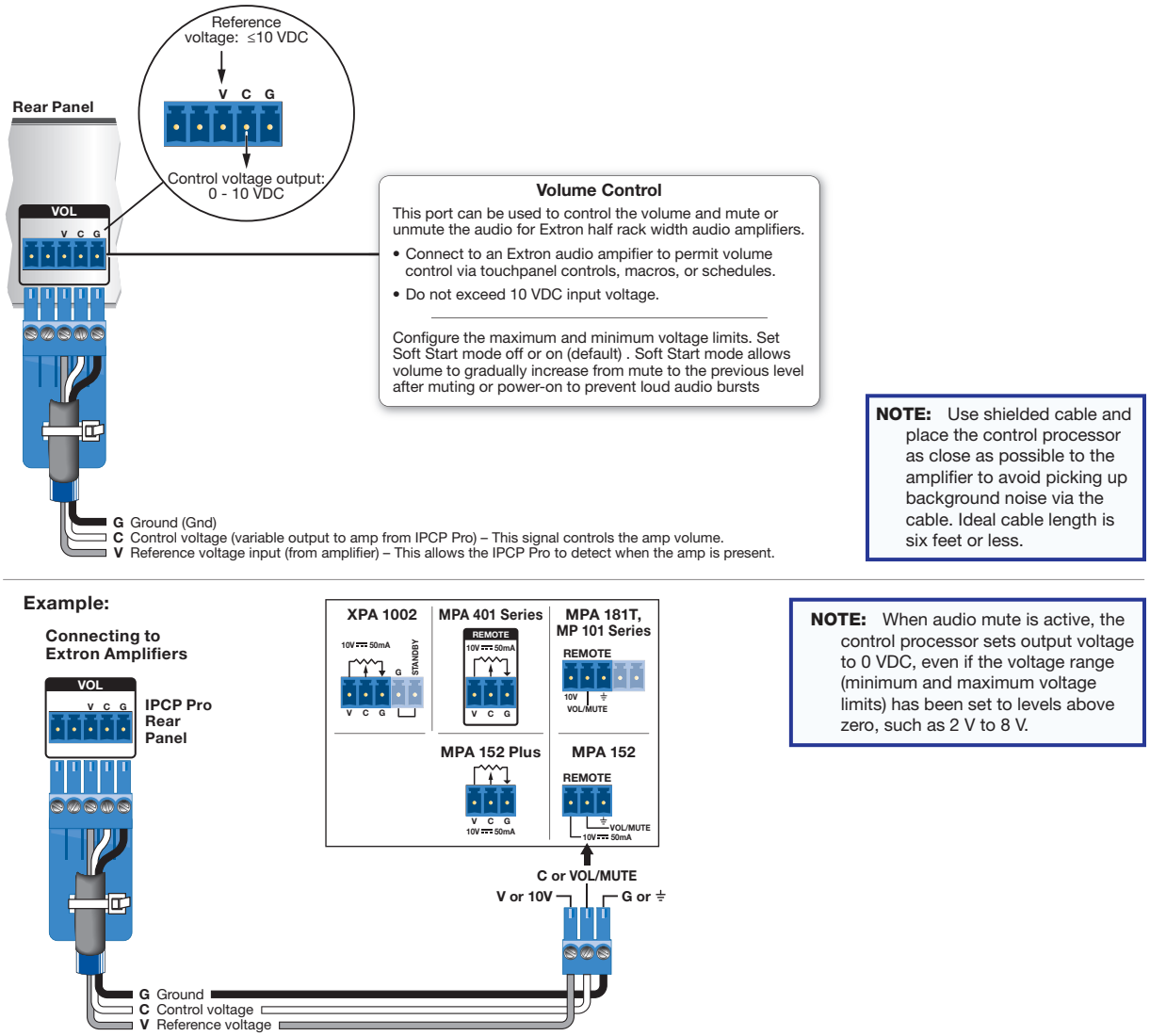
Reference voltage: ≤10 VDC
V C G
Control voltage output: 0 - 10 VDC
Rear Panel
VOL
V C G
Volume Control
This port can be used to control the volume and mute or unmute the audio for Extron half rack width audio amplifiers.
• Connect to an Extron audio amplifier to permit volume control via touchpanel controls, macros, or schedules.
• Do not exceed 10 VDC input voltage.
Configure the maximum and minimum voltage limits. Set Soft Start mode off or on (default) . Soft Start mode allows volume to gradually increase from mute to the previous level after muting or power-on to prevent loud audio bursts
G Ground (Gnd)
C Control voltage (variable output to amp from IPCP Pro) – This signal controls the amp volume.
V Reference voltage input (from amplifier) – This allows the IPCP Pro to detect when the amp is present.
NOTE: Use shielded cable and place the control processor as close as possible to the amplifier to avoid picking up background noise via the cable. Ideal cable length is six feet or less.
Example:
Connecting to Extron Amplifiers
VOL
V C G
IPCP Pro Rear Panel
XPA 1002
10V 50mA
G
STANDBY
V C G
MPA 401 Series
REMOTE
10V 50mA
V C G
MPA 181T, MP 101 Series
REMOTE
10V
VOL/MUTE
MPA 152 Plus
V C G
10V 50mA
MPA 152
REMOTE
VOL/MUTE
10V 50mA
C or VOL/MUTE
V or 10V
G or ⏚
G Ground
C Control voltage
V Reference voltage
NOTE: When audio mute is active, the control processor sets output voltage to 0 VDC, even if the voltage range (minimum and maximum voltage limits) has been set to levels above zero, such as 2 V to 8 V.

**Figure 17. Volume Control Port Wiring Examples**

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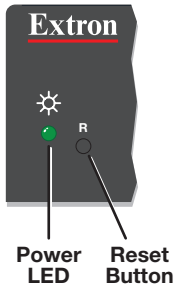
## Resetting the Unit

There are three reset modes that are available by pressing the Reset button on the front panel (for most models) or the rear panel (for the IPCP Pro 350M). The Reset button is recessed, so use a pointed stylus, ballpoint pen, or Extron Tweeker to access it. See the **reset modes table** on the next page for a summary of the modes.




**ATTENTION:**

- Review the reset modes carefully. Using the wrong reset mode may result in unintended loss of flash memory programming, port reassignment, or a unit reboot.
- Étudier de près les différents modes de réinitialisation. Appliquer le mauvais mode de réinitialisation peut causer une perte inattendue de la programmation de la mémoire flash, une reconfiguration des ports ou une réinitialisation de l'unité.

**NOTE:** If you hold down the reset button continuously, the LED blinks every 3 seconds, and the unit enters a different mode, from the Reset all IP Settings" mode through the Reset to Factory Defaults mode. For rReset to Factory Defaults mode the LED blinks three times, the third blink indicating the last mode. The modes are separate functions, not a continuation from one mode to the next..

Project recovery ability can be disabled by removing a jumper from header 1 on the circuit board inside the control processor. Disabling project recovery mode is not recommended. However, if you choose to do so, you must take precautions for your safety and to avoid product damage from electromagnetic discharge.

**WARNING:** **Risk of electric shock.** To prevent electric shock, always unplug the product from the AC power source before opening the enclosure.

**AVERTISSEMENT:** **Risque de choc électrique :** Débranchez l'alimentation secteur du produit avant d'ouvrir le boîtier.

**ATTENTION:**

- Do not touch any switches or other electronic components inside the IPCP. Doing so could damage the IPCP.
- Ne touchez aucuns sélecteurs ou autres composants électroniques à l'intérieur du IPCP. Cela pourrait endommager le IPCP.
- Electrostatic discharge (ESD) can damage IC chips even though you cannot feel, see, or hear it. You must be electrically grounded before proceeding with firmware replacement. A grounding wrist strap is recommended.
- Les décharges électrostatiques peuvent endommager les puces de circuit même si vous ne pouvez pas les sentir, les voir ou les entendre. Vous devez être électriquement relié à la terre avant de procéder au remplacement de micrologiciel. Un bracelet de mise à la terre est recommandé.

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## IPCP Pro Series Control Processor Reset Mode Summary

| Mode | Activation | Result | Purpose and Notes |
|---|---|---|---|
| **Use Factory Firmware** | To start the Use Factory Firmware reset mode and replace firmware:<br>**1.** On the control processor, hold down the recessed Reset button while applying power to the unit. Hold the button down until the Power LED flashes twice. The control processor enters factory firmware mode, and the LED flashes quickly.<br>**2.** Upload new firmware to the unit as desired (see **Updating the Firmware** on page 38 for details).<br>**NOTE:** After a User Factory Firmware reset is performed, update the IPCP firmware to the latest version. **Do not** operate the IPCP control processor firmware version that results from the reset. This mode temporarily resets the unit to factory default until power is recycled. If you want to use the factory default firmware, you must upload that version again. See the *Global Configurator Help* file for firmware upload instructions. | The unit continues to run factory-installed firmware until the user updates the firmware or power is cycled to the unit, which then reboots with the last loaded version of the firmware.<br>**The control processor reverts to the factory default firmware.** Event scripting does not start if the unit is powered on in this mode. All user files and settings such as drivers, adjustments, and IP settings are maintained.<br>**NOTE:** To return the unit to the firmware version that was running prior to the reset, cycle power to the unit. | Use this mode to temporarily boot up the unit with factory-installed firmware for a single power cycle in the event that a firmware update has failed or if incompatibility issues arise with user-loaded firmware.<br>**NOTE:** User-defined web pages may not work correctly if using an earlier firmware version. |
| **Project Recovery** | To start the Project Recovery reset mode and recover a project:<br>**1.** On the PC, open Global Configurator.<br>**2.** Click the **Tools** menu and select **Project Recovery**. The Recovery Mode dialog box opens.<br>**3.** Enter the IP address or host name of the target device for which you want to perform project recovery.<br>**4.** Click **Recover**. The software attempts to connect to the control processor. It allows indefinite time to establish a connection (until a connection is made or the user clicks **Cancel**).<br>**5.** On the control processor, hold down the recessed Reset button while applying power to the unit. Hold the button down until the Power LED flashes twice. The control processor enters project recovery mode for 20 seconds, during which time the LED flashes quickly.<br>GC automatically connects to the control processor, then opens and retrieves the project from the unit.<br>**6.** Perform an absolute reset on the control processor:<br>**a.** Hold down the Reset button for about 9 seconds until the Power LED blinks three times (once at 3 seconds, again at 6 seconds, again at 9 seconds).<br>**b.** Release and press Reset momentarily (for <1 second) within 1 second. The control processor reboots and operates using the old firmware.<br>*Nothing happens if the momentary press does not occur within 1 second.<br>**7.** Open Toolbelt within Global Configurator, start device discovery, select the desired control processor from the list and click **Manage**.<br>**8.** Click the **Network Settings** tab and set the IP address of the control processor.<br>**9.** Click the **User Management** tab and change the password of the control processor.<br>**10.** Close Toolbelt.<br>**11.** In GC, add the new password to the recovered project.<br>**12.** Save the project.<br>**13.** Upload the project from GC to the control processor.<br>**14.** Upload firmware to the unit (see **Updating the Firmware** on page 38 for details).<br>**NOTE:** After a project recovery reset is performed, update the IPCP firmware to the latest version. **Do not** operate the IPCP control processor firmware version that results from the reset. This mode temporarily resets the unit to factory default until power is recycled. If you want to use the factory default firmware, you must upload that version again. See the *Global Configurator Help* file for firmware upload instructions. | **Project recovery mode stops regular operation and allows a connection to be made to the unit via GC software without requiring password entry so that project files can be retrieved and saved.**<br>• During product recovery mode, events are stopped, and so is communication with AV devices.<br>• While the control processor is in this mode, use the GC software to recover project files.<br>• If the software does not initiate project recovery within 30 seconds after the control processor enters this mode, the control processor exits recovery mode and returns to normal operation.<br>• Upon exiting project recovery mode:<br>  • The unit returns to its pre-recovery mode state and settings.<br>  • The Power LED returns to being steadily lit.<br>The unit continues to run factory-installed firmware until the user updates the firmware or power is cycled to the unit, which then reboots with the last loaded version of the firmware.<br>**The control processor reverts to the factory default firmware.** Event scripting does not start if the unit is powered on in this mode. All user files and settings such as drivers, adjustments, and IP settings are maintained.<br>**NOTE:** To return the unit to the firmware version that was running prior to the reset, cycle power to the unit. | Use this mode to...<br>• Recover project configuration and program files if passwords have been lost.<br>• Temporarily boot up the unit with factory-installed firmware for a single power cycle in the event that a firmware update has failed or if incompatibility issues arise with user-loaded firmware.<br>**NOTE:** User-defined web pages may not work correctly if using an earlier firmware version. |

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| IPCP Pro Series Control Processor Reset Mode Summary | | | |
|---|---|---|---|
| **Mode** | **Activation** | **Result** | **Purpose and Notes** |
| **Reset All IP Settings** | To reset all IP settings:<br>**1.** Hold down the Reset button for about 6 seconds until the Power LED blinks twice (once at 3 seconds, again at 6 seconds).<br>**2.** Release and press Reset momentarily (for <1 second) within 1 second*.<br>*Nothing happens if the momentary press does not occur within 1 second. | **Reset All IP Settings mode:**<br>• Sets the IP address back to factory default (192.168.254.250)<br>• Sets the subnet back to factory default (255.255.255.0)<br>• Sets the default gateway address to the factory default (0.0.0.0)<br>• Sets all other IP settings, addresses, and domain and host names back to factory default<br>• Sets port mapping back to factory default<br>• Turns DHCP off<br>• Turns events off<br>• Stops all user-created programs. | Reset All IP Settings mode enables you to reset IP settings and port maps to factory defaults. |
| **Reset to Factory Defaults** | To reset the unit to all factory default settings:<br>**1.** Hold down the Reset button for about 9 seconds until the Power LED blinks three times (once at 3 seconds, again at 6 seconds, again at 9 seconds).<br>**2.** Release and press Reset momentarily (for <1 second) within 1 second*.<br>*Nothing happens if the momentary press does not occur within 1 second. | **Reset to Factory Defaults mode performs a complete reset to factory defaults (except the firmware).**<br>• Does everything Reset All IP Settings mode does<br>• Clears driver-port associations (IR, serial, Ethernet) and port configurations<br>• Removes button/touchpanel configurations<br>• Resets all IP options<br>• Removes schedules, settings, macros<br>• Removes/clears all user-loaded files and configurations from the control processor | Reset to Factory Defaults mode is useful if you want to start over with configuration and uploading. |

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# Software-based Configuration and Control

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This section of the guide is divided into the following topics:


- **Configuration and Control: an Overview**
- **Basic Setup Steps: a Guide to this Section and Other Resources**
- **Downloading the Software and Getting Started**
- **Troubleshooting**


## Configuration and Control: an Overview

**An IPCP must be configured before use** in order to recognize and accept commands and pass them on to the controlled devices. It can be configured and controlled via a host computer connected to the same network as the control processor. See **LAN or LAN A (IP) connectors and LEDs** starting on page 16 for details about LAN port and cabling to connect the control processor to the network.

- Configure the control processor by using the Global Configurator software in GC Professional or GC Plus mode. See the Extron website for full system hardware and software requirements.
- The default web pages embedded within the control processor provide a means to view general hardware information, network settings, and, if configured, project information. The embedded web pages can also be used to update the IPCP firmware. You cannot configure the control processor via the embedded web pages.

## Basic Setup Steps: a Guide to this Section and Other Resources

**NOTE:** GC projects can be created offline and uploaded to the hardware at a later date.

Follow the steps in **Setup Checklist: How to Proceed With Installation** starting on page 7. The overall process for setting up a control processor is as follows:

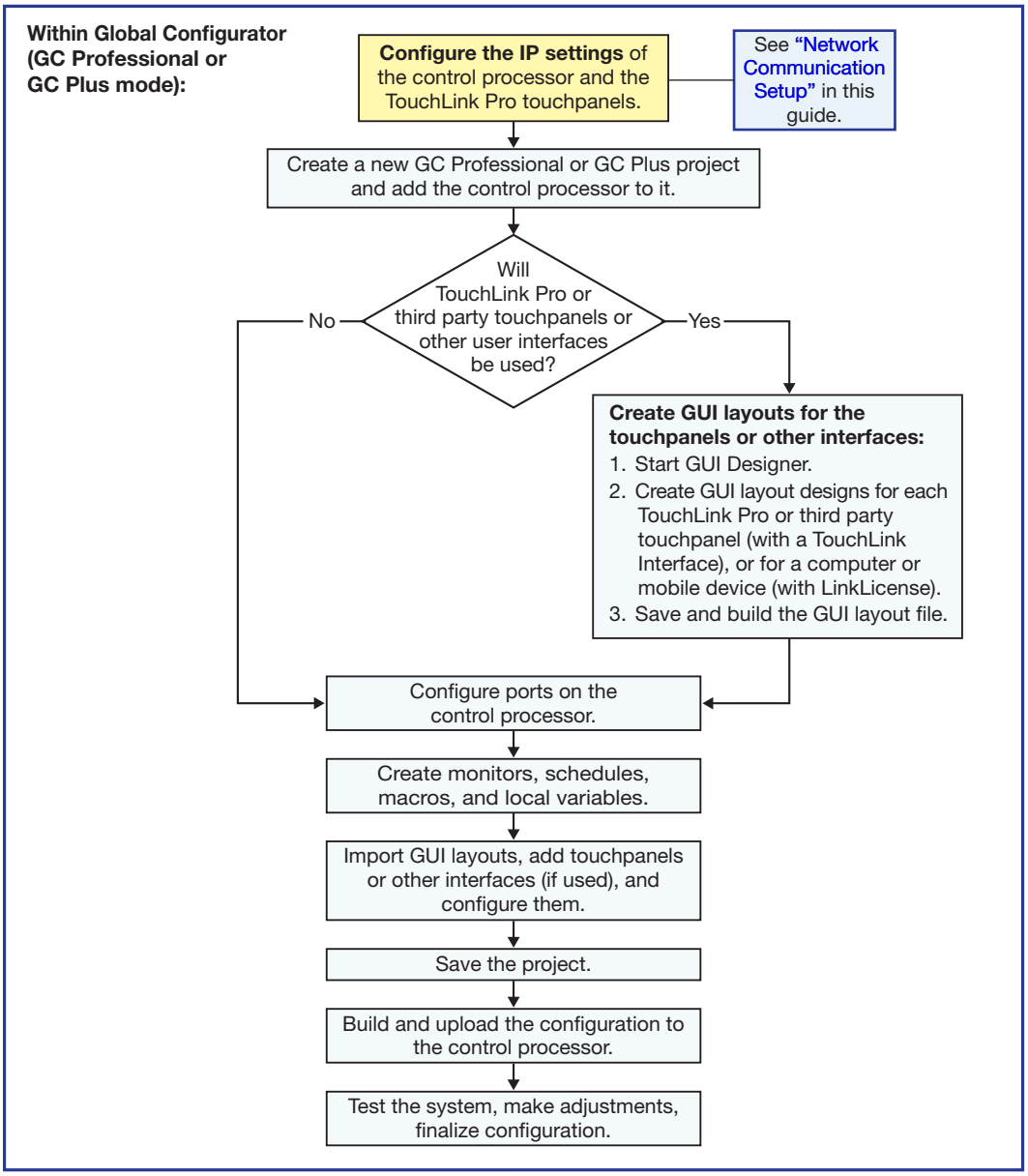
Within Global Configurator (GC Professional or GC Plus mode):
Configure the IP settings of the control processor and the TouchLink Pro touchpanels.
See "Network Communication Setup" in this guide.
Create a new GC Professional or GC Plus project and add the control processor to it.
Will TouchLink Pro or third party touchpanels or other user interfaces be used?
No
Yes
Create GUI layouts for the touchpanels or other interfaces:
1. Start GUI Designer.
2. Create GUI layout designs for each TouchLink Pro or third party touchpanel (with a TouchLink Interface), or for a computer or mobile device (with LinkLicense).
3. Save and build the GUI layout file.
Configure ports on the control processor.
Create monitors, schedules, macros, and local variables.
Import GUI layouts, add touchpanels or other interfaces (if used), and configure them.
Save the project.
Build and upload the configuration to the control processor.
Test the system, make adjustments, finalize configuration.

**Figure 19. Overall Configuration Steps**

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# Downloading the Software and Getting Started

GC software updates and a large variety of device drivers can be downloaded from the Download page on the Extron website (**www.extron.com/download/index.aspx**). When you locate the desired software or driver package, follow the on-screen directions to download and install it.

## Locating Software, Firmware, and Driver Files on the Extron Website

There are three main ways to find software, firmware, and device drivers within **www.extron.com**:

- Via links from the web page for the specific product
- Via the **Download Center** page (Click on the **Download** tab at the top of any page within www.extron.com.)
- Via links from search results

**NOTE:** For some software you have the option to click the **Download Now** button to begin downloading the software file. For other software there is a link for contacting an Extron support representative who can provide you access to the latest version.

To obtain Global Configurator (GC Professional, GC Plus) software, you must have an Extron Insider account and contact an Extron support representative. Extron provides training to our customers on how to use the software. Access to Global Configurator Professional is available to users who successfully complete Extron Control Professional Certification.

**NOTE: New RS-232 and Ethernet drivers are required**. You must use serial and Ethernet drivers developed specifically for the IP Link Pro platform. With the exception of IR device drivers, drivers used for the previous generation IP Link (non-Pro) control processors are not compatible.

### Via links from the web page for the specific product

1. Navigate to the web page for the specific product model by either...
   - Typing the model name into the search field in the upper right of any Extron web page and clicking the magnifying glass icon
     *or*
   - Selecting the model name from the **Product Shortcuts** drop-down list in the upper left of the Extron home page or Products page.
2. Click the **Downloads** tab in the middle of the product page. A list of available software, firmware, and documents for that model appears on screen.
3. Click on the name of the desired software or firmware to start downloading the file, or click on the link for device drivers to navigate to a page from which you can select either a driver package or specific drivers for individual devices.

   For Global Configurator in GC Professional mode, you must first attend Extron training, pass a proficiency test, and achieve Extron Control Professional Certification before being able to download that program.

### Via the Download Center page

1. Click on the **Download** tab at the top of any page within www.extron.com to access the **Download Center**.
2. Click on the link for the desired software product category (such as IP Link Pro software, TouchLink software, or device drivers) in the center of the screen. A page opens that allows you to make more specific selections from within that category.

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3. For **software**, click on the link for the specific software that you need. A software product page opens that provides a description of the software package, a list of system requirements, a list of features, and access to the release notes, in addition to a download link.
   For **drivers**, select a product name from the drop-down list.
4. For some software you have the option to click the **`Download Now`** button to begin downloading the software file. For other software, such as Global Configurator in GC Professional mode, there is a link for contacting an Extron support representative who can provide you access to the latest version.

   For **drivers**, navigate through the alphabetically arranged list to select and download a driver for a specific device.

### Via links from search results

1. Type the specific name of the software package (such as Global Configurator or GUI Designer) into the search field in the upper right of the page and click the magnifying glass icon. A search results page appears.
2. Click on the name of the software package. A software product page opens that provides a description of the software package, a list of system requirements, a list of features, and access to the release notes, in addition to a download link.
3. For some software you have the option to click the **`Download Now`** button to begin downloading the software file. For other software, such as Global Configurator with GC Professional mode, there may be a link for contacting an Extron support representative who can provide you access to the latest version.

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## Obtaining Control Drivers

Extron provides an extensive selection of device drivers available on the Extron website. Ethernet, serial, and infrared (IR) device drivers (for controlling projectors, displays, DVD players, document cameras, and so forth) are available as individual device driver files. Prior to configuration, download driver files for products that will be used in the installation.

**NOTE:** For serial or Ethernet devices, IPCP Pro Series control processors require IP Link **Pro** drivers. They do not support serial or Ethernet drivers that were created for IP Link (non-Pro) products. However, existing Extron IR driver files are supported.

If the system requires a driver that is not already available, you have additional options:

- Request a new serial (RS-232) or Ethernet driver from Extron.
- Create your own custom IR device driver using the IR learning feature within GC or Extron IR Learner software. The IR learning feature makes it possible to capture infrared codes from a handheld IR remote control and create custom drivers for operating the corresponding IR-controlled device. Follow the directions in the help file to create a driver by using the remote control for that device and the IR receiver port on the front panel of the IPCP Pro.

  **NOTE:** The IPCP 350M does not have an IR learning sensor.

## Things to Do After Installing GC and Before Starting a Project

- Read the *Global Configurator Help* file for details and step-by-step procedures on how to start a GC Professional or GC Plus project and perform basic setup tasks for a control processor.
- Obtain network addresses and related information from your network administrator.

- Set up the IP address for the control processor. See **Network Communication Setup** on page 9 for an overview of how to set up the network properties of the unit. For details, see the GC help file, which contains instructions on how to set the IP address, gateway IP address, subnet mask, mail server IP address, domain name, web port, SMTP username, and SMTP password so that the IPCP is able to communicate with the network.

## Using GC: Helpful Tips

### Resources and Notes

- The *IPCP Pro Series Setup Guide* is shipped with the unit, and it lists available resources (software, drivers, instructions). It includes a quick reference to the front and rear panel features, and covers basic hardware installation.
- The *Global Configurator Help* file provides a wealth of information on settings and how to use the software, itself. The help file, included with the software, covers basic setup steps and includes examples of how to use the features of GC and step by step instructions for typical configuration tasks.
- See **Front Panel Features** on page 10 and **Rear Panel Features and Connections** on page 12 in the "Hardware Features and Installation" section of this guide for features and settings for the ports you will configure.
- If you will configure the IPCP at the installation site, Extron recommends downloading drivers for all the devices in the installation before you go out into the field.
- The Global Configurator project file (`*.gcpro` or `*.gcplus`) contains configuration settings and it can be saved to a directory or folder for backup or for installation on another IPCP Pro control processor. Saving a configuration is recommended before you perform a firmware upgrade.
- The IPCP can be set up to allow configuration access only to administrators to prevent other users from making changes to settings, events, and controls.
- IP address, subnet mask, and gateway address are required during network setup of the control processor.
- The unit name is any name (for example, Room730-IPCPPro550, ConfRmSystem) that you want to use to label a specific IPCP unit. The default is a combination of the product name and part of the hardware (MAC) address. This can be changed to your choice of alphanumeric characters and hyphens (-).
  - Spaces are not permitted within the name of a unit.
  - Underscores (_) are not permitted.
  - Valid characters are A-Z, a-z, 0-9, and - (hyphen).
  - The name cannot start with a number or a hyphen, and it cannot end with a hyphen.
  - Maximum name length is 24 characters.

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# Troubleshooting

Turn on the input devices (DVD players, Blu-ray players, PCs, and other sources), output devices (display screens, projectors), the control processor, and the PC and touchpanel or eBUS button panels. Touch a configured button on the touchpanel or eBUS button panel.

If an input or output AV device cannot be remotely controlled (does not respond as expected), check the following:

## Power Connections

- Ensure that all devices are plugged in.
- Make sure that each device is receiving power. The IPCP front panel power LED lights if the device is receiving power.
- If the IPCP includes switched power output ports, verify that the overload indicator LED is not lit. If the switched 12 VDC power output Over LED is lit, the power draw at the switched power ports has been exceeded. To restore these ports to normal function, do the following:
  1. Correct the hardware cause of the overload. Disconnect one or more devices from the 12 VDC switched power output ports on the IPCP. The IPCP waits a moment and rechecks the power load.
     - If the total load (power draw) is now within safe limits, the IPCP automatically re-enables the ports. The green switched 12 VDC power status LEDs on the IPCP light, the red Over LED is unlit, and power is restored to the output ports.
     - If the total load still exceeds the maximum threshold, the Over LED remains lit and the ports remain off until the overload is corrected. See step 2.
  2. Repeat step 1 (disconnect another device from the switched power output ports) as needed until the Over LED turns off and all the green switched 12 VDC power status LEDs on the IPCP light.

## Data Connections

1. Check the cabling connections and make adjustments as needed. The Link LEDs on the IPCP and on the touchpanel or PC should be lit solid green if a network connection is detected. If these LEDs are not lit, either the cable is faulty or not plugged in, or the wrong type of cable is being used (see **LAN or LAN A (IP) connectors and LEDs** on page 16).
2. Try to “ping” the unit by entering `ping 192.168.254.250` at the command prompt on the PC, or use the IP or web address provided to you by your system administrator. If you get no response:
   - Make sure your unit is using the appropriate subnet mask (check with your system administrator).
   - Make sure your PC and network do not have a software firewall program that might block the IP address of the IPCP unit.
3. If contact is established with the unit, but the IPCP web pages cannot be accessed by your web browser, verify (via an Internet network options or preferences menu) that your web browser is configured for direct network connection and is not set up to use a proxy server.

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## Device Control Connections and Configuration

- Verify that ports are wired correctly and that ground (earthing) wires are connected to the proper pins on the control processor and, if applicable, on the controlled device.
- Ensure that each IR emitter head is placed adjacent to or directly over the IR pickup window on the controlled device.
- Verify that the appropriate drivers were used while creating the configuration file and that the correct commands and signal types (IR, RS-232, Ethernet) are associated with the appropriate ports on the control processor and on the other devices.
- For digital input and output connections, verify whether the application requires the +5 VDC pull-up resistor within the IPCP for TTL circuits and use the software to check whether it is selected within the configuration.
- Verify that input current at any digital input or output port does not exceed 250 mA.
- Verify that input current at the volume control port (IPCP Pro 250) does not exceed 10 VDC and that the amplifier is cabled correctly, as well.

If you are still experiencing problems, call the **Extron S3 Sales & Technical Support Hotline** or the **Extron S3 Control Systems Support Hotline** (1.800.633.9877).

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# Reference Information

This section of the guide includes the following reference items:

- **Glossary**
- **File Types: a Key to Extron-specific File Names**
- **Licensed Third Party Software Used in the Control Processors**

Full product specifications are available via the IPCP Pro Series product pages at **www.extron.com**.

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## Glossary

**10/100Base-T**
Ethernet which uses unshielded twisted pair (UTP - CAT 5, CAT 5e, CAT 6) cable, where the amount of data transmitted between two points in a given amount of time is equal to either 10 Mbps or 100 Mbps.

**1000Base-T, gigabit Ethernet**
An Ethernet standard that transmits at 1 Gbps over twisted pair wire.

**Custom web page**
Any file that can be loaded into an IPCP and served by the internal web server. The IPCP can be used for various web-based tasks. The web page provides a way to control the IPCP and other devices attached to it without use of the software, and with or without an accompanying event script. Any number and size of graphics can be used. If they are too large to fit in the nonvolatile memory of the IPCP, web pages can be created so that they can be served from another web server using Microsoft Internet Information Services (IIS).

**DHCP (Dynamic Host Configuration Protocol)**
A standardized client-server communications protocol that enables a server to automatically assign unique network addresses (IP address, subnet mask, gateway) to a device using a defined range of numbers configured for the network.

**DNS (Domain Name System)**
DNS is the application layer protocol that locates and translates an Internet domain name (such as www.extron.com) into a numerical Internet Protocol (IP) address. A domain name is an easy-to-remember “handle” for an Internet address.

**Driver**
A software package that controls the interface between the control processor and peripheral devices.

**Ethernet**
A network protocol that uses MAC addresses instead of IP addresses to exchange data between computers. Using ARP (see above) with TCP/IP support, Ethernet devices can be connected to the Internet. An Ethernet LAN typically uses unshielded twisted pair (UTP) wires. Ethernet systems currently provide transmission speeds of 10 Mbps, 100 Mbps (fast Ethernet), or 1000 Mbps (gigabit Ethernet).

**FTP (File Transfer Protocol)**
A protocol that is used to transfer files from one host to another host over a TCP-based network (such as the Internet). Also see Secure File Transfer Protocol (**SFTP**) for the version that incorporates security features.

**HTTP (Hypertext Transfer Protocol)**

A network protocol based on TCP/IP that is used to retrieve hypertext objects from remote web pages and allows servers to transfer and display web content to users.

**HTTPS (Hypertext Transfer Protocol Secure)**

A communications protocol for secure communication over a computer network. It allows web servers to transfer and display web content to users securely. All transferred data is encrypted so that only the recipient is able to access and read the content. It is not a protocol, itself, but rather a combination of Hypertext Transfer Protocol (HTTP) on top of the SSL/TLS protocol, which adds the security capabilities of SSL/TLS to standard HTTP communications.

**ICMP (Internet Control Message Protocol)**

ICMP is an Internet protocol is used by network devices (routers, switches, and the like) to send error messages or relay query messages. Typically ICMP messages are used for diagnostic or control purposes or are sent to the source IP address in response to IP operations errors. Error messages include notices that a device is not available or that a host or router could not be reached.

**IP (Internet Protocol)** The protocol or standard used to send information from one computer to another on the Internet.

**IP address** A unique, 32-bit, binary number (12 digit decimal number, xxx.xxx.xxx.xxx) that identifies each device or device port (an information sender and/or receiver) that is connected to a LAN, WAN, or the Internet. IP addresses can be static (see static IP) or dynamic (see **DHCP**).

**IP net mask/subnet mask — See subnet mask.**

**MAC (Media Access Control) Address**

A unique hardware number given to devices that connect to a network such as the Internet. When a computer or networking device (router, hub, interface, and the like) is connected to a LAN or the Internet, a table (which is used in ARP) relates the IP address of the device to its corresponding physical (MAC) address on the LAN. This protocol allows for several terminals or network nodes to communicate within a multi-point network, typically a local area network (LAN).

**NTP (Network Time Protocol)**

NTP is an Application layer networking protocol that synchronizes clocks among computers and other devices over networks.

**Ping** A utility/diagnostic tool that tests network connections. It is used to determine if the host has an operating connection and is able to exchange information with another host.

**Port number** A preassigned address within a server (such as the control processor) that provides a direct route from the Application to the Transport layer or from the Transport layer to the Application of a TCP/IP system.

**SFTP (Secure File Transfer Protocol)**

Similar to FTP, this protocol adds encryption and requires credentials for file transfers.

**SMTP (Simple Mail Transfer Protocol)**

SMTP is an Internet standard for e-mail transmission. By default, SMTP uses TCP port 25. SMTP connections secured by SSL, known as SMTPS, default to port 465.

**SNMP (Simple Network Management Protocol)**

SNMP is an Application layer protocol that facilitates the exchange of basic network management information between network devices. It helps in monitoring of operations and factors such as bandwidth, memory usage, remote password resets, and collection of error information. This protocol collects (and configures) information from network devices (such as servers, hubs, switches, and routers) on an Internet Protocol (IP) network.

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**SSH (Secure Shell)** SSH is a network protocol for secure data communication and providing various secure network services between two networked computers. SSH creates a secure channel over an insecure network to connect client and server devices. It allows confidential communications of passwords and similar data over public or otherwise insecure networks.

**Static IP** An IP address that has been specifically (instead of dynamically—see **DHCP**) assigned to a device or system in a network configuration. This type of address requires manual configuration of the actual network device or system and can only be changed manually or by enabling DHCP.

**Subnet — See subnetwork.**

**Subnet address** The portion of an IP address that is specifically identified by the subnet mask as the subnetwork.

**Subnet mask** A 32-bit binary number (12 digit decimal number, xxx.xxx.xxx.xxx) used on subnets (smaller, local networks) to help routers determine which network traffic gets routed internally (within the subnetwork) to local computers and which network traffic goes out to the rest of the network or the Internet. It is an address mask used to identify the bits of an IP address that are used for the subnet address. Using a mask, the router does not need to examine all 32 bits, only those selected by the mask.

**Subnetwork** A network that is part of a larger IP network and is identified by a subnet address. Networks can be segmented into subnetworks to provide a hierarchical, multilevel routing structure.

**TCP (Transmission Control Protocol)**
A connection-oriented protocol at the Transport layer of the Open Systems Interconnection (OSI, ISO/IEC 7498-1) reference model. It provides reliable end-to-end data delivery from one network device to another.

**TCP/IP (Transmission Control Protocol/Internet Protocol)**
The communication protocol of the Internet. Computers and devices with direct access to the Internet are provided with a copy of the TCP/IP program to allow them to send and receive information in an understandable form.

**Tool tip** Text that appears when the mouse pointer hovers over a button or other item on screen.

**UDP (User Datagram Protocol)**
A connectionless, Internet transport layer protocol that sends packets (datagrams) of information across networks using “best-effort” delivery. It is a relatively simple protocol that does not include handshaking. It is faster than TCP and is often used for broadcast and multicast communication, but it does not include data verification to ensure that all packets arrived at their destination.

**URL (Uniform Resource Locator)**
The address (such as www.extron.com) that lets a resource on the internet be identified, located, and accessed.

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## File Types: a Key to Extron-specific File Names

A basic understanding of the types of files used by the control processor is helpful in order to decide what (if anything) to do with them.

- _____**.eff** — This is an Extron firmware update file. See the **Firmware Updates** section starting on page 37 for details on firmware updates.
- ___**.eir** — These are IR driver files containing infrared commands. There is a separate **.eir** file for each device the IPCP controls via infrared communication. This is also the type of file created during IR learning. Via Global Configurator, these files can be imported and associated with one of the IR ports on a control processor.
- _____**.gc2** or _____**.gcz** — These are configuration files from older versions of Global Configurator (GC versions 3.x and earlier) that are used by Global Configurator only, not by the control processor. They contain configuration settings that must be processed by Global Configurator to create device configuration and event files for the IPCP.
- _____**.gcplus** — This is a Global Configurator Plus configuration file.
- _____**.gcpro** — This is a Global Configurator Professional configuration file.
- _____**.gdl** — This is a GUI Designer layout created for TouchLink Pro a touchpanel or third party touch interface.
- _____**.glta** — This is a GUI layout template.
-

PRELIMINARY

# Licensed Third Party Software Used in the Control Processors

The control processors use various licensed third party software packages during operation. To view details about third-party packages and associated licensing, click the **`License Information`** button in the internal web pages of the control processor. A License Information window opens.

To view a copy of a listed package license, in the License Information window, click the link in the License column for the relevant package. This opens a copy of the package license in a separate window.

The following table lists the licensed third party software packages used by the control processors.

**NOTE:** Licensed software packages used by the control processors are subject to change without notice.

| Licensed Third Party Software | | | |
|---|---|---|---|
| **Package** | **License** | **Package** | **License** |
| aufs2-util | GPL v2 | lightpd | BSD |
| avahi | LGPL v2.1 | linux-kernel | GNU GPL v2 |
| bstrib | BSD | linx-pam | BSD |
| busybox | GPL v2 | lua | MIT |
| bzip2 | BSD | luafilesystem | MIT |
| can-utils | GPL v2 | luasocket | MIT |
| cjson | MIT | minicom | GPL v2 |
| devmem2 | GPL v2 | mtd | GPL v2 |
| expat | MIT | ncurses | MIT |
| fcgi | fcgi | netsnmp | BSD |
| gnupg-1.4.7 | GPL v2 | ntp | MIT |
| gpgme-1.3.0 | LGPL v2.1 | openssh | BSD |
| i2c-tools | GPL v2 | openssl | OpenSSL |
| ifplugd | GPL v2 | pcre | BSD |
| json4lua | MIT | pexpect | MIT |
| libassuan-2.0.1 | LGPL v2.1 | popt | MIT |
| libcgicc 3.2.3 | LGPL v2.1 | psmisc | GPL v2 |
| libcurl | ICS | python3 | PSF |
| libdaemon | LGPL v2.1 | qt | LGPL v2.1 |
| libdnet | BSD | socat | GPL v2 |
| libfcgi | fcgi | spawn-fcgi | BSD |
| libffi | libaffi | sqlite | public domain |
| libgpg | LGPL v2.1 | tcpdump | BSD |
| libnl | LGPL v2.1 | tzdata | public domain |
| libpcap | BSD | uboot | GPL v2 |
| libsocketcan | LGPL v2.1 | udev | GPL v2 |
| libssh2 | BSD | xinetd | BSD |
| libusb | LGPL v2.1 | zlib | zlib |

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# Firmware Updates

If the need arises, you can replace the IPCP firmware without opening the unit or changing firmware chips. This section covers the following aspects of how to do that:

- **Determining the Firmware Version** — How to find the current firmware version
- **Updating the Firmware** — How to download and replace firmware

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## Determining the Firmware Version

There are several ways to check which version of firmware the control processor is using:

- View the device information in the Toolbelt feature within Global Configurator (GC Professional or GC Plus mode).
- View the general status information section of the IPCP embedded web pages.
- View the GlobalViewer (GV) web pages (if the control processor has already been configured and the GV web pages have been generated, built, and uploaded to the control processor).

Before using any of those methods, connect the control processor and the PC to the same network. For details see the **Hardware Features and Installation** section starting on page 7, the **Software-based Configuration and Control** section starting on page 25, and the *IPCP Pro Series Setup Guide*.

### Using Global Configurator

1. Start Global Configurator in either GC Professional or GC Plus mode.
2. Open the Toolbelt feature.
3. Either add the desired control processor manually or start device discovery and select the desired processor from the list of discovered devices.
4. Click **`Manage`** in the row for the desired control processor and view the device information that appears in that section.

### Using a Web Browser

The control processor comes with a set of factory default embedded web pages. Also, after configuration, the GlobalViewer (GV) application could be installed in the unit, providing a different set of web pages. See the *Global Configurator Help* file for information on how to use that software and the resulting web pages. Either type of web page (factory default or GV) can be used to find the firmware version and part number of the unit.

1. Start a web browser program.
2. Type the IP address of the control processor into the browser in the address field and log on to the internal web page or to the optional GlobalViewer web page stored in the control processor (see the *Global Configurator Help* file for details).
3. Look for the general device or status information section.

# Updating the Firmware

Firmware upgrade tools require the PC and the control processor to both be connected to an Ethernet network. The instructions for updating the IPCP firmware assume you have installed the appropriate software on your PC first.

**NOTES:**

- You should save the existing configuration to a file (see the *Global Configurator Help* file for instructions) before replacing the firmware. If the file is saved, the configuration can be restored to the IPCP later using GC.
- Check the Extron website (**www.extron.com**) for firmware-related documents, instructions, patch files, and new firmware files before loading new firmware into the control processor. We recommend that you read the firmware release notes (available from **www.extron.com**) before beginning the firmware update.

## Locating and Downloading the Firmware

1. Visit the Extron website to find the latest firmware file for the control processor. The easiest way to locate files is through the **Downloads** tab on the web page for the specific model.
2. Download the executable installer file (*`.exe`) from the website and run the installer program. The program automatically stores the firmware file on the PC in `C:\Program Files\Extron\Firmware` within a folder specific to that version.
3. Write down the firmware filename and location for later use. The filename ends in *.eff* such as `49-247-5Ø-x.xx.xxxx-yyyy.eff` where `x.xx.xxxx` is the version number.

   **NOTE:** The firmware update file must have a filename extension of `.eff`. If the file does not have that extension, it will not work properly.

## Installing Firmware

Firmware can be replaced by using one of the following:

- Global Configurator (using the Toolbelt feature)
- The firmware uploader feature in the default embedded web page

Both methods allow you to browse to find and select the appropriate `.eff` file on your PC and then click an **Upload** button to initiate the firmware upload to the control processor. Allow at least a couple minutes for the firmware to finish uploading. At the end of the upload process, the unit partially reboots and loses its connection to the PC. Therefore, to continue using the web page or Toolbelt you will need to refresh the web page or reconnect via Toolbelt after the firmware update.

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# Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

**USA, Canada, South America, and Central America:**
Extron Electronics
1230 South Lewis Street
Anaheim, CA 92805
U.S.A.

**Japan:**
Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

**Europe and Africa:**
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

**China:**
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

**Asia:**
Extron Asia Pte Ltd
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

**Middle East:**
Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or if modifications were made to the product that were not authorized by Extron.

**NOTE:** If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

**USA:** 714.491.1500 or 800.633.9876
**Asia**: 65.6383.4400
**Europe**: 31.33.453.4040
**Japan**: 81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

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| Extron Headquarters | Extron Europe | Extron Asia | Extron Japan | Extron China | Extron Middle East | Extron Korea | Extron India |
|---|---|---|---|---|---|---|---|
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